

NCHRP

RESEARCH REPORT 939

NATIONAL
COOPERATIVE
HIGHWAY
RESEARCH
PROGRAM

Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods

Volume 3: Research Overview

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**Guidebooks for Post-Award
Contract Administration
for Highway Projects
Delivered Using Alternative
Contracting Methods**

Volume 3: Research Overview

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2020

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed, and implementable research is the most effective way to solve many problems facing state departments of transportation (DOTs) administrators and engineers. Often, highway problems are of local or regional interest and can best be studied by state DOTs individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation results in increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

Recognizing this need, the leadership of the American Association of State Highway and Transportation Officials (AASHTO) in 1962 initiated an objective national highway research program using modern scientific techniques—the National Cooperative Highway Research Program (NCHRP). NCHRP is supported on a continuing basis by funds from participating member states of AASHTO and receives the full cooperation and support of the Federal Highway Administration (FHWA), United States Department of Transportation, under Agreement No. 693JJ31950003.

The Transportation Research Board (TRB) of the National Academies of Sciences, Engineering, and Medicine was requested by AASHTO to administer the research program because of TRB's recognized objectivity and understanding of modern research practices. TRB is uniquely suited for this purpose for many reasons: TRB maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; TRB possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; TRB's relationship to the National Academies is an insurance of objectivity; and TRB maintains a full-time staff of specialists in highway transportation matters to bring the findings of research directly to those in a position to use them.

The program is developed on the basis of research needs identified by chief administrators and other staff of the highway and transportation departments, by committees of AASHTO, and by the FHWA. Topics of the highest merit are selected by the AASHTO Special Committee on Research and Innovation (R&I), and each year R&I's recommendations are proposed to the AASHTO Board of Directors and the National Academies. Research projects to address these topics are defined by NCHRP, and qualified research agencies are selected from submitted proposals. Administration and surveillance of research contracts are the responsibilities of the National Academies and TRB.

The needs for highway research are many, and NCHRP can make significant contributions to solving highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement, rather than to substitute for or duplicate, other highway research programs.

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(continued on page vi)



FOREWORD

By **Edward Harrigan**

Staff Officer

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NCHRP Research Report 939 presents practical guidance for the post-award administration of projects delivered using alternative, nontraditional methods. The report will be of immediate interest to engineers in state and local transportation agencies and industry with responsibility for planning, designing, and delivering transportation projects using alternative contracting methods.

Much research and reporting has been completed in the past decade on project delivery using alternative contracting methods such as design-build, construction manager at risk, construction manager as general contractor (CM-GC), and other nontraditional methods. The bulk of this work has been accomplished with a focus on the decision process for pre-award procurement and project delivery. However, information is lacking on effective methods for administering alternative contracting method contracts after they have been awarded. Previous NCHRP research found that contract administration issues comprised most of the case law in alternative contracting methods, suggesting a need for an evaluation of current methods for post-award contract administration of design-build and CM-GC projects and the preparation of guidebooks describing the most effective methods available.

Under NCHRP Project 08-104, the University of Colorado Boulder—in association with Arizona State University and the University of Arizona—was tasked with developing practitioner guidebooks for post-award contract administration of design-build and CM-GC projects based on the identification and analysis of the methods used in the range of alternative contracting method projects. Their research entailed a review of the current state of the practice in post-award design-build and CM-GC contract administration, development of a model of the contract administration process, case studies of post-award contract administration of 19 design-build and 11 CM-GC projects, an effectiveness evaluation and calibration of tools for post-award contract administration, and testing of the draft guidebooks on ongoing and completed design-build and CM-GC projects.

The key outcomes of this research are *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design-Build Delivery* and *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 2: Construction Manager-General Contractor Delivery*. Volumes 1 and 2 also include Appendix A: Contract Administration Tools and Appendix B: Case Studies. Volume 3 is the contractor's final report, which provides results and analyses supporting the guidebooks' contents.

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CONTENTS

1 Chapter 1 Introduction

2	1.1 Problem Statement
2	1.2 Research Objectives
2	1.3 Research Framework and Scope of Work
3	1.4 Report Outline

4 Chapter 2 State of the Practice

4	2.1 Introduction
4	2.2 Federal and State Legislation
6	2.3 Alternative Contracting Manuals
8	2.4 Alternative Contracting Method Research
9	2.5 Summary

10 Chapter 3 Update to the AASHTO Guide for Design-Build Procurement

10	3.1 Introduction
10	3.2 Methodology
12	3.3 Summary

13 Chapter 4 Modeling the Contract Administration Process

13	4.1 Introduction
13	4.2 Choosing an Appropriate Process Modeling Approach
14	4.3 Overview of Integrated Definition Modeling
17	4.4 Design–Bid–Build, Construction Manager–General Contractor, and Design–Build Integrated Definition Model Introduction (Level 1)
23	4.5 Summary

24 Chapter 5 Case Study Project Selection

24	5.1 Introduction
24	5.2 Data Collection Process
25	5.3 Project Selection
27	5.4 Summary

28 Chapter 6 Case Study Interview Protocol

28	6.1 Introduction
28	6.2 Case Study Process
29	6.3 Case Study Questions
33	6.4 Case Study Follow-Up
34	6.5 Summary

35	Chapter 7	Agency Contract Administration Tools
35	7.1	Introduction
35	7.2	Tool Identification
36	7.3	Initial Tool Selection Survey
39	7.4	Final Tool Selection and Examples
39	7.5	Summary
40	Chapter 8	Guidebook Development and Testing
40	8.1	Introduction
40	8.2	Guidebook Structure and Layout
45	8.3	Guidebook Testing
45	8.4	Summary
46	Chapter 9	Conclusions and Recommendations
46	9.1	Conclusions
47	9.2	Challenges to Implementation
47	9.3	Recommendations
49	References and Bibliography	
53	Appendix A	Alternative Contracting Methods State Legislation and Manuals
64	Appendix B	Case Study Summaries
103	Appendix C	<i>AASHTO Guide for Design-Build Procurement</i> Provision Updates

CHAPTER 1

Introduction

The use of alternative contracting methods (ACMs) has accelerated the delivery of highway design and construction projects. These changes came about through efforts of FHWA and state transportation agencies over the last 30 years. Early successes on large, high-profile projects—such as the I-15 in Utah, the Intercounty Connector in Maryland, and the Sellwood Bridge in Oregon—resulted in shorter project delivery times with less disruption to the traveling public. Thus, many agencies were motivated to implement ACM projects, and the use of ACMs is increasingly becoming commonplace. Although these early examples were relatively large, ACM is not only applicable to large projects. Recent data show that almost half of the state highway agencies are routinely using ACMs on projects less than \$20 million in value (Alleman et al. 2015, Alleman et al. 2017).

The impact of FHWA and state agencies' innovative efforts should not be underestimated. The development of ACMs—such as design-build (D-B) and construction manager-general contractor (CM-GC)—required significant procedural and cultural changes on the part of agency staff, as well as on the part of the consulting and construction industries. Therefore, it is not surprising that state agency ACM manuals and national research efforts focused on the early project phases; namely, procurement and project delivery method decisions. A review of current ACM manuals reveals only a few manuals that addressed contract administration processes in detail, with the New York State Department of Transportation (New York State DOT) and the Minnesota Department of Transportation (Minnesota DOT) being two of the best examples. Similarly, AASHTO's *Recommended AASHTO Design-Build Procurement Guide* and the *Guidebook for Construction Manager/General Contractor Contracting for Highway Projects* focused on setting projects up for success by concentrating mostly on the pre-award phases of the process.

This research addressed the need for national guidance on ACM post-award contract administration by producing the following guidebooks:

- *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design-Build Delivery* and
- *NCHRP Research Report 939: Guidebook for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 2: Construction Manager-General Contractor Delivery*.

These guidebooks provide the necessary methods and tools to help state agencies better administer D-B and CM-GC contracts on highway construction projects. This research report documents the rigorous process followed to produce these two guidebooks.

1.1 Problem Statement

The objective of this research was to produce two practitioner guidebooks in AASHTO format based on the identification and analysis of the tools utilized on a range of ACM projects for post-award contract administration of D-B and CM-GC projects. The primary research question these guidebooks addressed was “What are the most effective tools for post-award contract administration of D-B and CM-GC projects?” As previously mentioned, the majority of existing ACM manuals focused on the procurement phase, highlighting a post-award gap and presenting a tremendous opportunity to study and document post-award phases. The goal of these guidebooks was to focus on the following phases:

- Alignment,
- Design,
- Preconstruction Services (CM-GC only),
- Construction, and
- Project Closeout.

1.2 Research Objectives

The research team developed the following six distinct objectives to accomplish the goal of developing two guidebooks for D-B and CM-GC contract administration:

1. Present the most effective tools for post-award contract administration for D-B and CM-GC projects.
2. Identify tools for different complexities and sizes of D-B and CM-GC projects.
3. Describe effective tools to implement project design and construction quality assurance.
4. Highlight critical elements of pre-award services contracts and procurement documents that address and mitigate risks in post-award contract administration.
5. Identify and contrast different strategies for post-award contract administration of D-B and CM-GC projects.
6. Recommend implementation strategies and training for parties involved in post-award contract administration of D-B and CM-GC projects.

1.3 Research Framework and Scope of Work

The overall research framework stemmed from (1) a rigorous identification of the research components through state-of-practice reviews and case studies, (2) a peer-review process that measured contract administration tool effectiveness, and (3) a tested approach to combine all of these critical components into comprehensive and agency-friendly guidebooks. By using these guidebooks, agency personnel will be able to develop programs and select the most effective ACM contract administration tools on the basis of project type and complexity.

The objectives of this research were accomplished through the following nine distinct tasks:

Task 1a. Review State-of-Practice—Identify, critically review, assess, and summarize agencies’ current applications and key products of relevant research on post-award ACM contract administration, with a focus on tools and processes used by various agencies.

Task 1b. Select Projects—Apply a methodologically rigorous approach to select 30 diverse D-B and CM-GC projects.

Task 1c. Develop Contract Administration Integrated Definition Process Models—Develop a series of integrated definition process models to define the ACM contract administration process at an appropriate level for data collection and to aid in laying out the AASHTO guidebooks.

Task 2. Develop a Draft Framework for ACM Administration—Combine the Task 1a, 1b, and 1c findings into a coherent organizational framework that clarified roles, responsibilities, and tools for CM-GC and D-B contract administration processes.

Task 3. Develop an Interim Report—Present the NCHRP project panel with a comprehensive report of the findings and description of the processes.

Task 4. Conduct Project Case Studies—Use a multiple case study approach to analyze, summarize, and document methods and tools in use by state agencies on the projects identified in Task 1b.

Task 5. Evaluate and Calibrate Tools' Effectiveness—Conduct peer review panel testing of the framework to map ACM tools' effectiveness on various project types.

Task 6. Develop Guidebooks and Testing—Test guidebooks with an independent expert panel and state agency project teams.

Task 7. Develop Implementation Memo—Develop a PowerPoint training outline and an executive summary.

Task 8. Finalize Guidebooks—Develop guidebooks with effective tools and data gathered from all previous tasks and NCHRP project panel guidance.

Task 9. Finalize Research Report—Document the research process and findings.

1.4 Report Outline

This research report describes the steps taken by the research team to develop the final guidebooks for D-B and CM-GC post-award contract administration and to accomplish the previously described objectives and tasks. The outline of this research report is as follows:

- **Chapter 1. Introduction**
 - Discusses the background, objectives, and research method
- **Chapter 2. State of the Practice**
 - Presents the state-of-practice results
- **Chapter 3. Update to the AASHTO Guide for Design–Build Procurement**
 - Identifies examples of D-B contract provisions used to update the existing *AASHTO Guide for Design–Build Procurement*
- **Chapter 4. Modeling the Contract Administration Process**
 - Presents the integrated definition models for design–bid–build (D-B-B), CM-GC, and D-B created to define the contract administration phases
- **Chapter 5. Case Study Project Selection**
 - Presents the process used to identify and select case studies
- **Chapter 6. Case Study Interview Protocol**
 - Presents the method used to conduct the case study interviews
- **Chapter 7. Agency Contract Administration Tools**
 - Presents the processes used to identify, select, develop, and test the agency contract administration tools
- **Chapter 8. Guidebook Development and Testing**
 - Presents the steps taken to develop and test the final guidebooks
- **Chapter 9. Conclusions and Recommendations**
 - Presents the results of this research and recommends future research
- **References and Bibliography**
- **Appendices**
 - Appendix A: Alternative Contracting Methods State Legislation and Manuals
 - Appendix B: Case Study Summaries
 - Appendix C: *AASHTO Guide for Design–Build Procurement* Provision Updates

CHAPTER 2

State of the Practice

2.1 Introduction

This chapter discusses the review of ACM state of practice conducted as part of this research. The review focused on post-award contract administration. For D-B, this included design and construction. For CM-GC, this included preconstruction services and construction. The United States has a long history of implementing D-B-B, including projects delivered to establish the Interstate highway system. Only over the past couple of decades have ACMs—such as D-B and CM-GC—been used in transportation. To achieve best results, research suggests that agencies new to ACMs should begin using ACMs on smaller, less complex projects to slowly learn the process before implementing these methods on larger projects (Gambatese et al. 2002, City of Seattle 2011) as a way to slowly introduce this change in culture, philosophy, and practice (Miller et al. 2000, Molenaar and Gransberg 2001, Pietroforte and Miller 2002, Gransberg et al. 2008, Minchin et al. 2014). The need to build ACM experience suggests that there may be tools or processes unique to ACMs that promote project success. However, there has been little research or documentation cataloguing of existing ACM tools and processes for post-award contract administration. Over time, states have developed their own manuals to provide guidance for D-B, CM-GC, and ACMs, in general.

The ACM state-of-practice review addressed several perspectives, including ACM legislation, existing ACM manuals, and the research literature. The initial summary findings indicated the following:

- State legislation for D-B is more widespread than for CM-GC;
- State manuals covering D-B are more widespread than for CM-GC;
- State agencies use specific tools and processes for ACM contract administration; however, there was no comprehensive documentation of these tools;
- Tools exist for administering contracts for D-B-B, as well as for D-B and CM-GC. However, the stakeholder roles and timing sometimes differ for ACM projects; and
- Tools and processes included both tangible documents (e.g., a cost-savings matrix) and recommended practices (e.g., constructability reviews).

2.2 Federal and State Legislation

The federal government takes a proactive position on advancing transportation in the nation. Congress declares that it is in the national interest to promote the use of innovative technologies and practices that increase the efficiency of construction of, improve the safety of, and extend the service life of highways and bridges [Moving Ahead for Progress in the 21st Century Act (MAP-21) 2012]. The examples provided consists of innovative contracting methods, including the design-build and the construction manager-general contractor

contracting methods. The FHWA Every Day Counts program advanced the use of ACMs through training and project support. FHWA completed two Every Day Counts initiatives to enhance innovation and improve highway planning, design, construction, and operation. ACMs are becoming more mainstream, and FHWA is supporting them through its resource center programs (FHWA 2016e).

At the state transportation level, Florida Department of Transportation (Florida DOT) initiated D-B in 1987 (Ellis et al. 1991, FHWA 1996). FHWA established Special Experimental Project Number 14 (SEP-14) Innovative Contracting in 1990 to encourage and enable state transportation agencies to test and evaluate D-B and CM-GC projects on an experimental basis (FHWA 2016c). The Design-Build Contracting Final Rule (*Federal Register* 2002) was based on the results of D-B projects under SEP-14, in compliance with the Transportation Equity Act for the 21st Century (TEA-21) (1998). The Design-Build Contracting Final Rule established regulations for D-B contracting as 23 CFR 636 (FHWA 2016c). The rule provided regulations concerning the criteria and procedures for approving the nonexperimental use of D-B projects (*Federal Register* 2002). D-B regulations were updated in accordance with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (2007). The updates allowed a D-B request for proposal (RFP) to be released prior to receiving National Environment Policy Act of 1969 (NEPA) review process clearance. However, final design and construction could commence only after the completion of the NEPA review process (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users 2007).

Similarly, CM-GC was also authorized for federally funded transportation projects under MAP-21, Section 1303. This act built on SEP-14, which initially encouraged limited deployment of CM-GC in federally funded transportation projects (FHWA 2016b, FHWA 2016c). Section 1303 described the preconstruction and construction phases of CM-GC; the competitive selection of CM-GC with regard to qualifications, experience, best value, or other appropriate factors; and the requirement to complete the NEPA review process prior to proceeding with construction (MAP-21 2012). A final rule for CM-GC contracting was established and became effective on January 3, 2017 (*Federal Register* 2017).

Key ACM dates for transportation include

- 1987: Florida DOT D-B program
- 1990: SEP-14
- 2002: D-B Contracting Final Rule
- 2005: SAFETEA-LU
- 2011–2012: Every Day Counts-1
- 2012: MAP-21
- 2013–2014: Every Day Counts-2
- 2017: CM-GC Contracting Final Rule

The use of ACMs for transportation generally requires state legislation. Most—but not all—states started implementing legislation for D-B before CM-GC. Therefore, more states have legislation related to D-B, as compared with CM-GC. State legislation was researched through FHWA (2016a) and the Design-Build Institute of America (2016). In addition, numerous online resources and staff were consulted during the summer and fall of 2016. As of March 2019, varying levels of state legislation were authorizing D-B for transportation projects. Only North Dakota did not have D-B legislation for transportation. In comparison, 33 states did not have CM-GC legislation for transportation. Table 2.1 indicates which states had D-B and CM-GC legislation as of this date. Appendix A, Table A.1, provides a more detailed listing of ACM legislation for transportation in each state.

Table 2.1. States with design-build and construction manager-general contractor legislation.

	AL	AK	AZ	AR	CA	CO	CT	DC	DE	FL	GA	HI	ID	IL
D-B	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CM-GC		•	•		•	•	•			•			•	
	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE
D-B	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CM-GC					•				•	•		•		
	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD
D-B	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CM-GC	•			•							•		•	
	TN	TX	UT	VT	VA	WA	WV	WI	WY					
D-B	•	•	•	•	•	•	•	•	•	•				
CM-GC	•		•			•								

2.3 Alternative Contracting Manuals

Manuals and policies are document formats commonly used by state transportation agencies to communicate guidelines. Table 2.2 summarizes the manuals developed by state agencies to communicate guidance related to ACMs as of March 2019. A complete list of state manuals is provided in Appendix A, Table A.2.

D-B, CM-GC, ACM, and construction manuals are all documents in which states may communicate guidelines for ACMs. The research team's findings—based on studying existing manuals—are summarized as follows:

- 22 states had manuals specifically for D-B,
- Three states had manuals specifically for CM-GC,

Table 2.2. State departments of transportation with manuals related to alternative contracting methods.

Manuals	AL	AK	AZ	AR	CA	CO	CT	DC	DE	FL	GA	HI	ID	IL
D-B Manuals		•	•	•	•	•		■			•		•	•
CM-GC Manuals			•			•	**							
ACM Manuals					•	•								
Construction Manuals	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE
D-B Manuals					•		•	•		•		*	•	
CM-GC Manuals														
ACM Manuals									•	•				
Construction Manuals	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD
D-B Manuals					•	•		•		*			*	*
CM-GC Manuals														
ACM Manuals	•											•		
Construction Manuals	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TN	TX	UT	VT	VA	WA	WV	WI	WY					
D-B Manuals	•	*	•	•	•	•	•	*						
CM-GC Manuals				*										
ACM Manuals														
Construction Manuals	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Note: ** = project specific; * = documents instead of a complete guidebook.

- Six states had manuals for ACMs in general, and
- 26 states did not have a manual for D-B, CM-GC, or ACMs.

The CM-GC manuals tended to cover the following topics:

- Introduction,
- Procurement,
- Preconstruction Services,
- Contract Administration, and
- Appendices.

These topics were covered at various levels. Some manuals covered a topic extensively; other manuals did not cover that same topic at all. For example, the CM-GC guidance found in the Utah DOT was seven pages long and focused on procurement issues only. Alternatively, the CM-GC manuals for Arizona DOT and Colorado DOT covered all five of the aforementioned topics. The Arizona DOT manual was 57 pages of text and 58 pages of appendices. The Colorado DOT manual was 83 pages of text and 216 pages of appendices. Most manuals helped clarify roles and responsibilities. For example, in the Preconstruction Services sections, services included collaboration with the design team, value engineering, scheduling, and cost modeling. Constructability reviews are a key task for the contractor during design. Colorado DOT described the extensive nature of constructability reviews with the following:

As part of the collaborative design process, the Contractor provides constructability reviews for the feasibility and practicality of any proposed means and methods; selected materials, equipment, and labor; material availability; site improvements; earthwork and foundation considerations; and coordination of the Drawings and Specifications, verification of quantities, and so forth. Through this review the Contractor should provide alternatives that provide cost or schedule savings or limit impacts on the traveling public (Colorado Department of Transportation 2015a).

The preconstruction services could also include developing a construction management plan, subcontractor and supplier plans, disadvantaged business enterprises plan, emerging small business plan, and on-the-job training plan. Arizona DOT included developing the guaranteed maximum price (GMP) proposal as part of the preconstruction services. However, Colorado DOT considered it a separate contracting phase. For the construction phase, both the Arizona DOT and the Colorado DOT manuals highlighted topics that had unique features for CM-GC, such as quality assurance—quality control, measurement and payment, maintenance and protection of traffic, record keeping, risk pools, and force accounts. Because the contractor was involved through the design phase, contract modifications and value engineering proposals during construction were minimized. Some ACM state manuals did not address CM-GC.

In contrast to CM-GC manuals, D-B manuals tended to include chapters on project development, which typically led into project procurement. For example, some of the chapters included in the California Department of Transportation (Caltrans) D-B manual are Introduction; Project Development; Procurement Documents; RFP Issuance, Proposal Evaluation, and Contract Execution; and Contract Administration.

Colorado DOT added sections on risk management and streamlined D-B. Arkansas DOT added a section on the FHWA—Department oversight process for D-B projects. Some D-B manuals—such as those from Colorado, New York, and Pennsylvania—were lengthy, with more than 100 pages of text (not including appendices). Other D-B manuals—such as those from Massachusetts, North Carolina, Ohio, Utah, Vermont, and Virginia—were brief, with less than 20 pages of text (not including appendices). Some D-B manuals focused on D-B selection (e.g., Utah) or procurement (e.g., Virginia and Massachusetts). The majority also covered D-B project administration. Some state transportation agencies—such as those in California, Michigan, Nevada, and Pennsylvania—included D-B guidelines to clarify roles and responsibilities within their ACM manuals. The agency was often reminded not to direct the D-B firm,

but instead to verify conformance to the contract requirements. Otherwise, the agency might be accepting liability, risk, and cost for directives that were given.

A review of the D-B and CM-GC manuals revealed a variety of processes and tools used in ACMs. This review was conducted by reading all existing D-B and CM-GC manuals, identifying tools mentioned in the manuals, and organizing them according to the categories of the *AASHTO Guide Specifications for Highway Construction* (2008b). Manuals were reviewed until a saturation point was reached, meaning that the same tools were reappearing in the selected manuals with no additional tools being identified. Some of the identified tools may also have been used with D-B-B. Those tools underwent further investigation to determine whether the overlapping tools had unique applications or practices in ACMs.

2.4 Alternative Contracting Method Research

Design-Build Research

Accelerated project delivery is a common reason for selecting D-B (Ellis et al. 1991, Molenaar et al. 1999, Chan 2000, Construction Management Association of America 2012, Gransberg and Loulakis 2010). Time savings in D-B projects are typically associated with overlap in the design and construction phases, as well as streamlining of the construction phase itself because of the early engagement of contractors.

Many researchers have studied ACM in general and D-B more specifically. A significant portion of the existing ACM literature focuses on quantifying ACM performance. A meta-analysis of 30 studies comparing the performance of D-B-B, CM-GC, and D-B confirmed 2 decades of research showing that ACMs significantly improved project speed and reduced project cost growth (Sullivan et al. 2017). However, most existing studies did not pinpoint why such improvements occur, and most did not identify the D-B tools and processes that led to this superior performance.

Some of the post-award tools identified in the literature considered important for D-B projects included co-location, communication channels, partnering, third-party coordination, constructability, risk allocation, quality assurance–quality control roles, alternate technical concepts, value engineering, and warranties (Ellis et al. 1991, FHWA 2006, Gransberg et al. 2008, Gransberg and Windel 2008, Gransberg and Loulakis 2010). Additional factors that could influence performance included incentives (e.g., early completion incentive, traffic management, revenue sharing, and project quality incentives) and disincentives (e.g., late completion penalties and stipulated damages), according to FHWA (2006). However, incentives and disincentives can be used with D-B and D-B-B projects. They are not unique to D-B.

Construction Manager-General Contractor Research

Similar to D-B, accelerated project delivery was a common reason for selecting CM-GC (City of Seattle 2011, Construction Management Association of America 2012, Schierholz 2012). Moreover, FHWA's Every Day Counts initiative promoted CM-GC as a way to foster innovation, mitigate risk, improve design quality, improve cost control, and optimize construction schedule (FHWA 2016d). Studies have compared the performance of CM-GC to other delivery methods (Sanvido and Konchar 1998, Francom et al. 2016). Here again, most studies did not focus on identifying the CM-GC tools and processes that affected project performance. Gransberg and Shane (2010) summarized 15 studies that identified the benefits of CM-GC. Some of the post-award tools and processes identified in the literature included fast-tracking, constructability input, early cost estimating, early work packaging, value

engineering, third-party coordination, and shared risk (Gambatese et al. 2002, Schierholz 2012, Gransberg et al. 2012). To achieve improved project performance and make full use of the CM-GC method, appropriate tools and processes for preconstruction services and construction are needed. Preconstruction services can be divided into four categories: design-related, cost-related, schedule-related, and administrative (Gransberg and Shane 2010, Gransberg et al. 2012). Not all types of preconstruction services in these four categories are needed on every CM-GC project. Some of these services included a series of meetings, such as design reviews, constructability reviews, operability reviews, and regulatory reviews. The meetings served as a tool to reach a specific goal. Other services—such as preparing project schedules and cost estimates—allowed the contractor to use standard tools to achieve a product early and throughout design. For example, an Independent Cost Estimator is a tool that an agency can use to check the contractor's cost model for fairness, budget alignment, and completeness (Gransberg et al. 2012).

CM-GC requires the agency to take an active role in project delivery:

This role of the CM-GC firm does not replace the public agency's responsibility for monitoring the progress of the work, [for] processing payment applications (which is far more complex with CM-GC than the traditional design–bid–build process), and [for] active participation in evaluating and prioritizing alternates, overall decision-making, and total project budget management (Gambatese et al. 2002).

The designer's role changes as well:

Designers are required to take a much more active role in working with the owner and contractor during the entire design process, for such things as early and continuous value engineering, right-of-way phasing, real-time pricing, increased coordination meetings, accelerated designs, etc., during the early stages as well as throughout the entire design process (Minchin et al. 2013).

Based on their case study research, Gransberg et al. (2012) listed 11 CM-GC tools, most of which focused on procurement activities. This further reinforces the value of this research in identifying a portfolio of tools and processes for CM-GC post-award contract administration.

2.5 Summary

The state-of-practice review indicated that there was a strong base of ACM legislation in a majority of states. Additionally, there were a number state agencies that developed their own D-B, CM-GC, and ACM manuals. These manuals had varying levels of detail and guidance. A majority of published research on ACM looked at performance variations, advantages and disadvantages of ACMs, and lessons learned. However, an organized comprehensive catalog of best practice tools and processes for ACM post-award contract administration does not exist. The guidebooks developed in this research fill this need and provide support to state agencies embarking on D-B and CM-GC highway construction projects.

CHAPTER 3

Update to the AASHTO Guide for Design–Build Procurement

3.1 Introduction

This research, originally published in 2008, provided an update to the *AASHTO Guide for Design–Build Procurement*. The current research provides an update to the RFP examples, project documents, and minor language throughout the *AASHTO Guide for Design–Build Procurement* to make these elements align with progress that has occurred since the first publication. The combination of an updated *AASHTO Guide for Design–Build Procurement* and the newly created *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design–Build Delivery and Volume 2: Construction Manager–General Contractor Delivery* will provide state agencies with all of the necessary information to effectively deliver D-B projects from the procurement stage through project closeout.

3.2 Methodology

To update the *AASHTO Guide for Design–Build Procurement*, the research team performed a review of current state agency D-B RFPs to find examples of more current procurement contract provisions. The relevant RFP content analysis examples that replaced outdated RFP examples are shown in Appendix C. The consultant team, peer review team, and research team reviewed the changes for accuracy and acceptability.

The RFP content analysis began with an exploratory search of publicly available RFPs. The research team mined data from all 50 state DOT websites. The team found 150 RFPs from 22 states and issued between the years 2011 and 2016 that were publicly available online. From these 150 RFPs, 96 contract provisions from 12 states were chosen for peer review team analysis. These provisions were selected according to their level of detail and clarity. Provisions were only selected if they were equal to or greater than the quality of the existing *AASHTO Guide for Design–Build Procurement* contract provisions. In general, the research team found the new contract provisions to be longer and more detailed than the original provisions. This may reflect that agencies better understand what is now needed for an effective provision or that the provisions may have grown in length as they were used on multiple projects.

The 96 selected contract provisions from the RFPs were sent in full to the 15 members of the peer review team. Each peer review member was given three to seven categories based, on their expertise and length of the categories. Eleven peer review team members responded, as shown by the following review summary. All categories received at least two reviews and a summary from the reviewers. Reviewed material can be seen in Table 3.1.

Table 3.1. Contract provisions reviewed by the peer review team.

Peer Review Team	Basic Configuration	Alternative Technical Concepts	Betterments	Utility Relocation	Quality Management	Design Submittal, Review, and Approval	Engineer of Record	Traffic Control	Differing Site Conditions	Environmental Permitting	Right-of-Way	Order of Document Precedence	Reference Documents	Ownership of Documents	Stipend	Warranty	Payment Method	Progress Schedule	Project Acceptance	Nonconforming Work
Dave Zanatell											X						X			
Steve Waddle					X	X				X							X			
Mark Rolfe							X	X	X	X										
Edward Hammontree										X	X	X	X	X						
David Sadler															X	X	X	X	X	X
Jake Goettle	X	X	X	X	X															
Peter Davich	X	X	X	X	X															
Lisa Choplin	X	X	X	X		X														
John Carlson												X	X	X	X	X	X	X	X	X
James Ernzen						X	X	X	X					X	X					
Bill Hinton											X	X	X				X	X	X	X
Number of Reviews	3	3	3	3	3	3	3	2	2	3	2	3	3	3	3	3	4	4	4	4

Each peer review member was asked to grade each contract provision as “average,” “good,” or “excellent” and to provide comments. The research team accumulated the ratings and comments that each provision received and chose which provisions to add to the updated *AASHTO Guide for Design-Build Procurement*. The summary of proposed provisions can be seen in Table 3.2. These provisions typically received at least one “excellent” grading, and all received an average grade of either “good” or “excellent.” One “Ownership of Documents”

Table 3.2. Contract provisions graded and chosen per category.

Contract Provisions	Number of Provisions Graded	Number of Provisions Chosen
Basic Configuration	7	3
Alternative Technical Concepts	5	2
Betterment	3	2
Quality Management	5	3
Design Submittal, Review, and Approval	6	3
Engineer of Record	5	2
Differing Site Conditions	5	3
Environmental Permitting	5	3
Right-of-Way	6	2
Utility Relocation	4	2
Order of Document Precedence	6	2
Reference Documents	4	2
Ownership of Documents	3	2
Stipend	6	2
Payment Method	6	3
Progress Schedule	3	2
Project Acceptance	4	3
Nonconforming Work	6	2
Traffic Control	4	2
Warranty	3	2
TOTALS	96	47

and one “Project Acceptance” contract provision that received an overall grade of “average” were included because of the research team’s detailed review and approval. The research team chose 47 of the 96 provisions to add to the *AASHTO Guide for Design–Build Procurement*, as seen in Table 3.2. A full summary of the provisions can be seen in Appendix C.

3.3 Summary

This research provides an update to the *AASHTO Guide for Design–Build Procurement*. The research team provided 47 vetted contract provisions used by agencies between 2011 and 2016 to replace the original contract provision examples, all which were published before 2008. At the end of this research project, NCHRP began the process of AASHTO voting on an approval of this update. However, the outcome of the voting and publication was not known when this research report was being written.

CHAPTER 4

Modeling the Contract Administration Process

4.1 Introduction

The research team developed D-B-B, CM-GC, and D-B Integrated Definition (IDEF) models to break down the contract administration processes to an appropriate level of detail. The traditional D-B-B IDEF model was used as a baseline comparison for the alternative contract administration processes. The CM-GC and D-B models were used to guide the research and case study data collection, describe the methods and tools to be included in the guidebooks, and organize the layout of the AASHTO guidebooks. IDEF modeling is an illustration tool used to portray complex processes using activity nodes with inputs, outputs, constraints, and mechanisms. See Appendices B and C for a more detailed description accompanying the D-B-B, CM-GC, and D-B IDEF models developed.

The research team benefited from the expertise of Stuart Anderson of Texas A&M University's College of Engineering to develop the initial IDEF models. The University of Colorado Boulder hosted an IDEF modeling charrette with the research team and Dr. Anderson to collaboratively develop IDEF Level 0 and Level 1 for the D-B-B, CM-GC, and D-B contract administration models. The research team then conducted multiple interviews with practitioners consisting of agency representatives, consultants, and contractors, while iterating on each model's development. The resultant D-B-B, CM-GC, and D-B IDEF process models can be seen in Appendices B and C.

The IDEF models that were developed focused on contract administration functions and their connections through inputs and output. Details of mechanisms and constraints were discussed during the case studies. The IDEF models were informed by the *AASHTO Construction Guide Specifications*; *AASHTO Guide for Consultants*; current ACM state agency manuals; current ACM state agency construction manuals; ACM state agency RFPs; consultant subject-matter expert knowledge; and agency representative surveys, interviews, and case studies.

Prior to developing the process models, the research team investigated appropriate process modeling methods and ultimately focused on two process models: IDEF and Business Process Model and Notation (BPMN).

4.2 Choosing an Appropriate Process Modeling Approach

To ensure the best presentation of data, the researchers compared two competing process models: IDEF0 and BPMN. Each model was reviewed to find a process model to present the overall post-contract award process, methods, and tools to be used in an easy-to-comprehend graphical format. The researchers compiled a description of each model from online reviews, manual reviews, and discussions with users.

The primary goal of BPMN is to provide a notation that can be understood by everyone that will perform, manage, and monitor these processes. BPMN creates a standardized bridge for the gap between the business process design and process implementation. It is used to clearly show a process, so that practitioners can replicate that process easily. BPMN is formatted in such a way that the process flow and required decisions are easily understood (i.e., receive input A, perform action B, make decision C, if decision is x go to D, and if decision is y go to E). In contrast, IDEF0 modeling is designed to depict the action items of a process along with their inputs, outputs, constraints, and the tools—or mechanisms—used to perform them. A comparison of the two models through a design invoice review process example can be seen in Figure 4.1.

Compared with BPMN, IDEF0's weakness lies in its lack of decision nodes. This makes it difficult for a practitioner to perform the presented process. Alternatively, IDEF0's strength is in its clear presentation of activities and the tools needed to perform them. As the purpose of the process model for this project was not to inform practitioners, decision nodes were not needed. Furthermore, information on the process of implementing tools for ACM contract administration is provided in the accompanying guidebooks. Thus, the process models did not need to convey guidance on tool implementation. In summary, IDEF0's strengths worked well for the primary use of clearly portraying activities and associated methods and for the tools needed to inform the case studies and guidebook framework. Additionally, IDEF0 was previously used on NCHRP projects (e.g., *NCHRP Report 390*). For these reasons, the researchers chose to use IDEF0.

Note that IDEF1, IDEF1X, IDEF3, IDEF4, and IDEF5 process models also exist. However, these models were not considered for the modeling process as their software included applications not required for this research. These applications include information flow analysis, resource loading, simulation, and more. Throughout this research report, IDEF will be used as an equivalent to IDEF0 for simplicity.

4.3 Overview of Integrated Definition Modeling

IDEF modeling is an illustration and mapping tool that portrays complex processes using activity nodes with inputs, outputs, constraints, and mechanisms. IDEF consists of a family of modeling languages first developed for the U.S. Air Force in the 1970s for modeling complex manufacturing systems (Mayer 1990). Previous transportation-related studies have used IDEF modeling to map processes associated with planning and programming (Lambert et al. 2006), constructability reviews (Fisher et al. 2000), and state DOT information flows (Moor et al. 1985). Since the 1970s, IDEF modeling has advanced to incorporate multiple functions, such as decision analysis and cash loading. However, the needs of this project warranted the most basic of the methods (i.e., IDEF0), which is used for function modeling and description of existing systems.

IDEF0 provides easy-to-understand graphics and concise system descriptions using process inputs, controls, outputs, and mechanisms (ICOMs) (Figure 4.2).

Inside the box is the function, which is an activity or transformation. This function is identified by a verb phrase that describes what the function must accomplish. Inputs are the data or objects that are transformed by the function to create an output. The output is the data or object produced by the function. Inputs and outputs correspond to work products developed by the agency, design-builder, construction manager, and others. Constraints are conditions that shape or influence the process and output. They are the rules that govern how a function performs. Examples of constraints include contract terms, agency policy, project management procedures, and more. The mechanisms are tools used to perform a function. For this project, mechanisms will define the project participants, roles, and responsibilities associated with each tool.

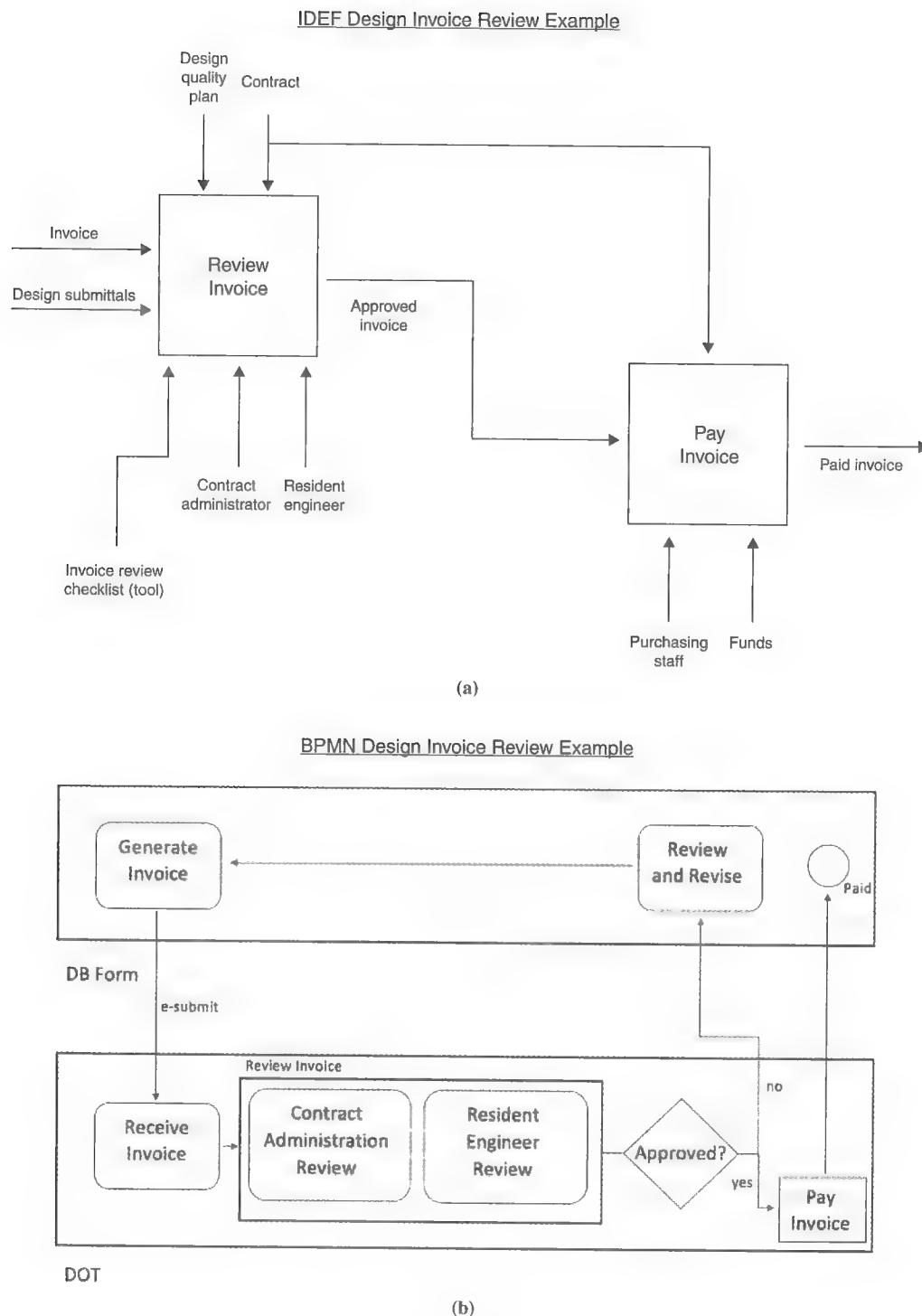


Figure 4.1. A design invoice review activity shown with (a) IDEF and (b) BPMN modeling.

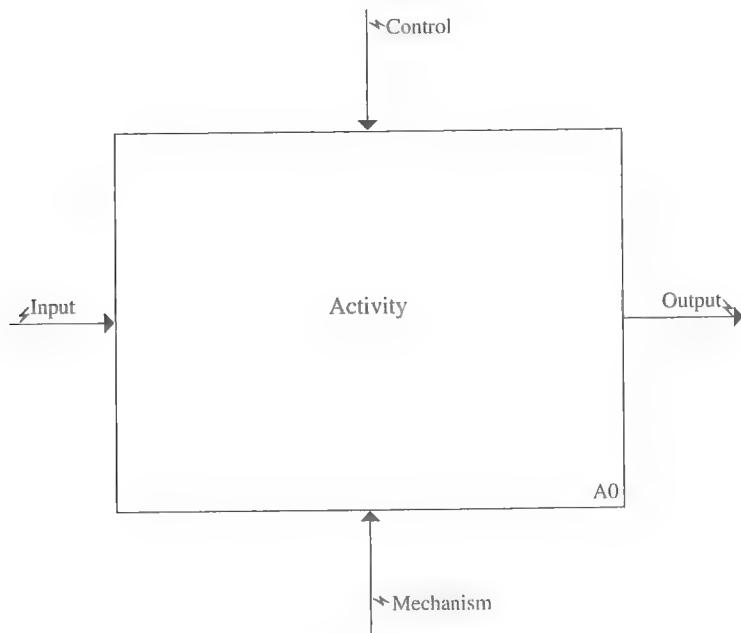


Figure 4.2. IDEF template activity model.

An example that relates to this project can be seen in Figure 4.3. (Note that this is not actually a part of our IDEF models but is presented as a relevant example). Reviewing a design invoice takes the submitted invoice—along with the design submittals—and creates either an approved, paid invoice or a rejected invoice with comments. However, the IDEF model does not indicate decision factors that determine the output for any particular input. The design contract acts as a constraint that guides execution of the function reviewing design invoice. The contract administrator and project controls system are mechanisms that aid this function.

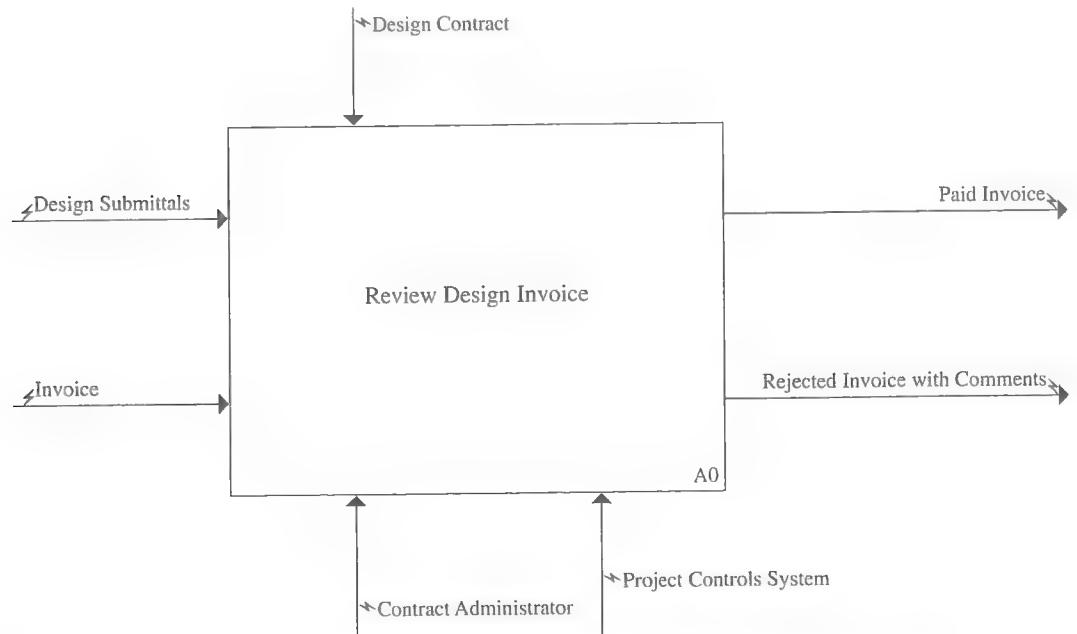


Figure 4.3. IDEF Review Design Invoice Model Level 0 (for examples only).

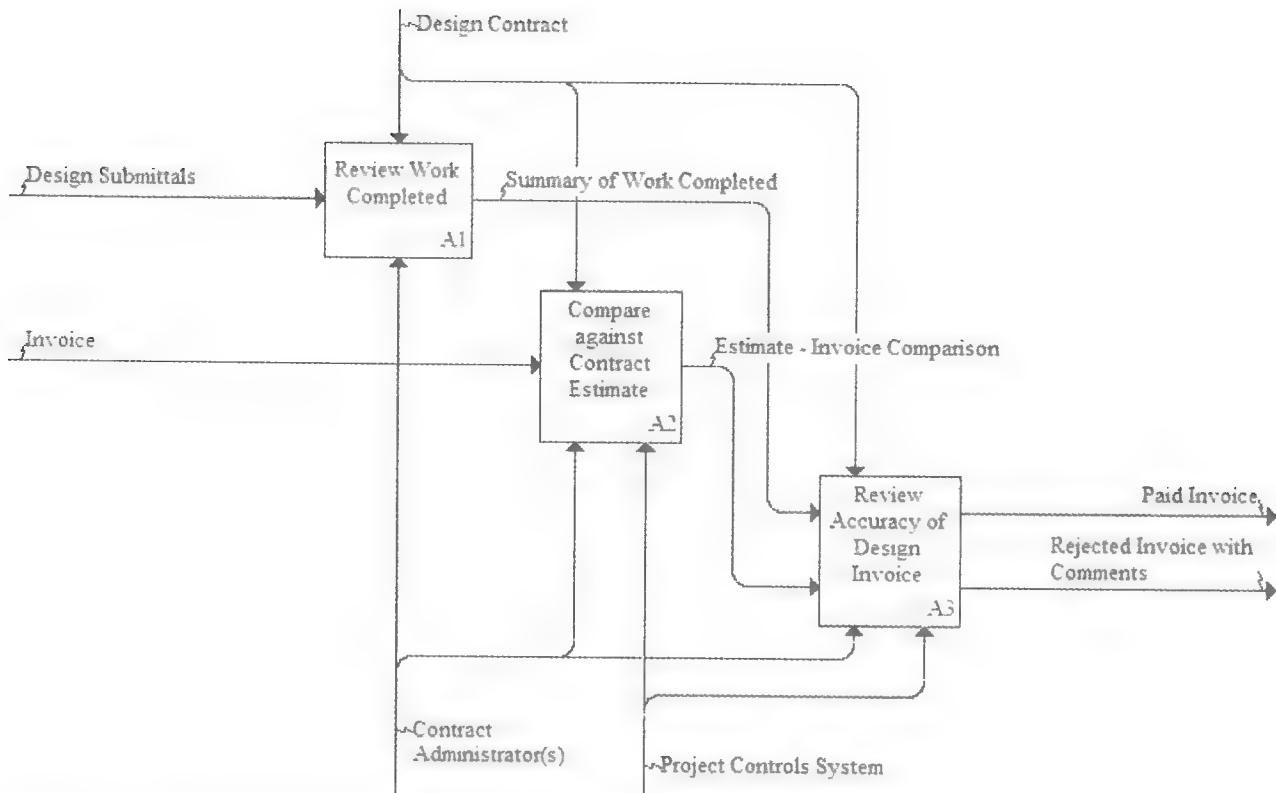


Figure 4.4. IDEF Review Design Invoice Model Level 1 (for example only).

Figure 4.3 is an example of the highest level of the task review design invoice. (In the IDEF model notation, this is labeled as A0). This is the highest level in the process hierarchy and encompasses all subprocesses for review design invoice. Subprocesses are described in their own IDEF model and in the lower levels of parent activity. Figure 4.4 shows Level 1 of this IDEF review design invoice model example, which uses activity labels A1, A2, A3, and A(n). It further breaks out the review design invoice process into review work completed, compare against contract estimate, and review accuracy of design invoice. All of these processes are required to review the design invoice. The inputs, constraints, mechanisms, and outputs from Level 0 are all present in Level 1. There are also added outputs for activities that become inputs to other activities and depict how the Level 1 activities relate to each other. Although not shown in this example, there can be additional constraints and mechanisms that do not exist in the level directly above. Each activity in Level 1 can be broken out into a deeper level, similar to the Level 0 to Level 1 parent-child relationship. This activity can be further broken down as far as desired by the user whenever there are subprocesses.

4.4 Design-Bid-Build, Construction Manager-General Contractor, and Design-Build Integrated Definition Model Introduction (Level 1)

This section compares Level 1 (highest level) of D-B-B, CM-GC, and D-B IDEF models. All three models work toward the final output of a completed project but achieve this outcome in slightly different ways. The highest level of the detailed IDEF process descriptions for D-B-B delivery is shown in Figure 4.5. These IDEF models were developed from an agency's perspective and focus on the tasks the agency needs to perform.

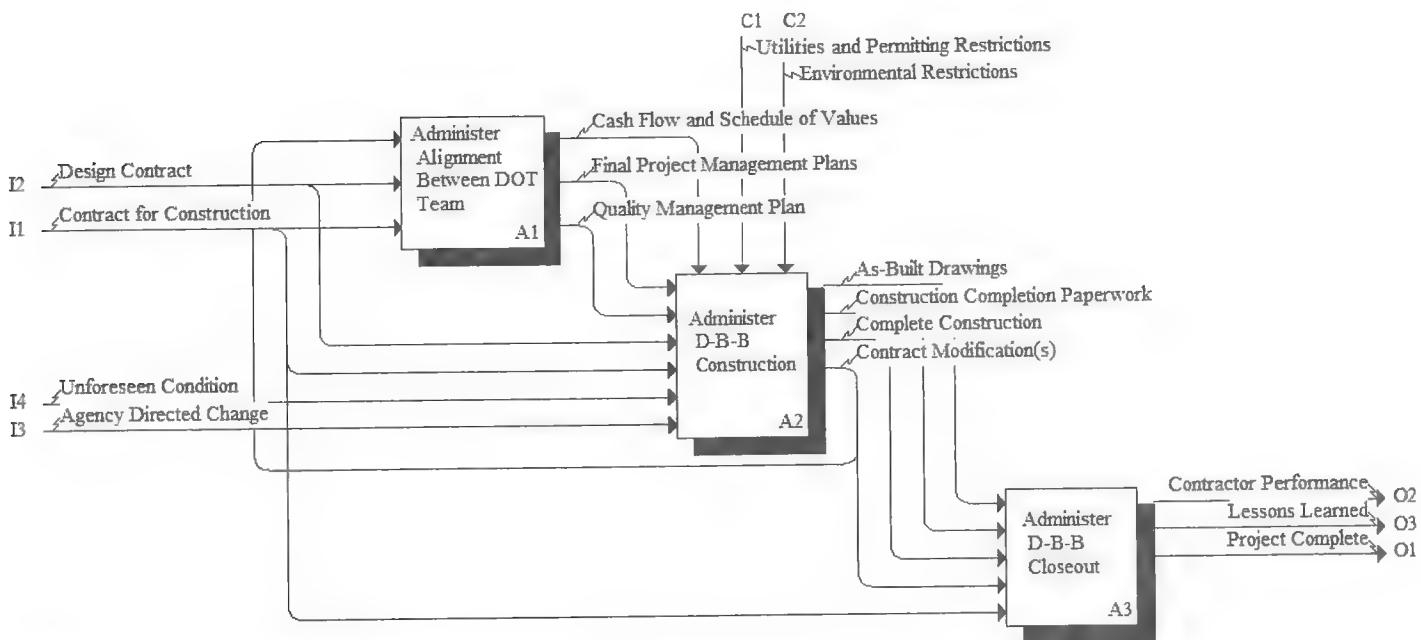


Figure 4.5. Level 1 of the D-B-B IDEF Model.

The agency primarily administers the contracts while the designers and contractors are fulfilling work tasks. Therefore, each node in Level 1 begins with “Administer.” D-B-B, D-B, and CM-GC have three, four, and five main processes, respectively, as shown in Table 4.1.

Table 4.2 shows a more detailed comparison of the major activities a state agency performs and how these activities are structured across the three models. Gaps in Table 4.2 highlight differences in the models. In addition to the difference in activities, the models have differences in inputs, outputs, and constraints. Other differences include the stakeholders involved in various activities and the timing of their involvement. The completed IDEF models are available upon request by contacting Mounir El Asmar at Arizona State University or Keith Molenaar at the University of Colorado at Boulder.

To further understand the models, each of the Level 1 activities are discussed. In Activity A1 Administer Alignment Between CM-GC, Designer, and Owner, the owner holds a kickoff and team alignment meeting in which the payment schedule, work package execution flow, communication plan, organizational structure, and roles and responsibilities of the owner are discussed and formalized. The project management plans (i.e., cash flow schedule, public relations plan, construction plan, risk management plan, quality management plan, and schedule

Table 4.1. Level 1 IDEF Model comparison of D-B-B, D-B, and CM-GC.

D-B-B	D-B	CM-GC
A1 Administer Alignment Between the DOT Team	A1 Administer Alignment Between D-B and Owner	A1 Administer Alignment Between CM-GC, Designer, and Owner
A2 Administer D-B-B Construction	A2 Administer D-B Design	A2 Administer CM-GC Design
A3 Administer D-B-B Closeout	A3 Administer D-B Construction	A3 Administer CM-GC Preconstruction Services
	A4 Administer D-B Closeout	A4 Administer CM-GC Design
		A5 Administer CM-GC Closeout

Table 4.2. Design–Bid–Build, Construction Manager–General Contractor, and Design–Build Model activities.

D-B-B IDEF Model Framework		CM-GC IDEF Model Framework	D-B IDEF Model Framework
A Administer D-B-B Design			
A21 <u>Ensure Design Compliance</u>			
A211 <i>Ensure Environmental Compliance</i>			
A212 <i>Manage Utilities and Permits</i>			
A213 <i>Manage ROW and Temporary Construction Easements</i>			
A214 <i>Ensure Functional Requirements</i>			
A215 <i>Ensure Schedule Requirements</i>			
A22 <u>Review Design Package</u>			
A23 <u>Approve Design Invoice</u>			
A24 <u>Perform Life-Cycle Cost Analysis, Value Engineering, and/or Applicable Sustainability Measure</u>			
A25 <u>Manage Design Documentation</u>			
A26 <u>Enact a Contract Modification That Impacts Design</u>			
A27 <u>Negotiate Post-Design Services</u>			
A2 Administer D-B-B Contract			
A1 <u>Administrator Alignment Between CM-GC, Designer, and Owner</u>			
A11 <u>Conduct Kickoff Meeting</u>			
A12 <u>Administrator Team Alignment Meeting</u>			
A13 <u>Pursue CM-GC Project Delivery Innovations</u>			
A14 <u>Align Project Plans</u>			
A131 <u>Align Stakeholder Management Plans</u>			
A132 <u>Agree Upon Cash Flow, Schedule of Values, and Schedule</u>			
A133 <u>Review Quality Management Plans and Risk Management Plan</u>			
A134 <u>Align Construction Implementation Plans with Designer, CM-GC, and State DOT</u>			
A135 <u>Execute Partnering Plan–Align Team Integration</u>			
A136 <u>Develop Project Plan Package</u>			
A2 <u>Administrator CM-GC Design</u>			
A21 <u>Ensure Design Compliance</u>			
A211 <i>Ensure Environmental Compliance</i>			
A212 <i>Manage Utilities and Permits</i>			
A213 <i>Manage ROW and Temporary Construction Easements</i>			
A214 <i>Ensure Functional Requirements</i>			
A215 <i>Ensure Schedule Requirements</i>			
A22 <u>Manage Work Package Coordination</u>			
A23 <u>Review Design Package</u>			
A24 <u>Approve Design Invoice</u>			
A25 <u>Perform Life-Cycle Cost Analysis, Value Engineering, and/or Applicable Sustainability Measure</u>			
A26 <u>Manage Design Documentation</u>			
A27 <u>Enact a Contract Modification That Impacts Design</u>			
A28 <u>Negotiate Post-Design Services</u>			

(continued on next page)

Table 4.2. (Continued).

D-B-B IDEF Model Framework		CM-GC IDEF Model Framework	D-B IDEF Model Framework
A21	<u>Administer D-B-B Construction</u>	A3 Administer CM-GC Preconstruction Services	A3 Administer D-B Construction
A21	<u>Manage Legal Relations</u>	A31 Review CM-GC Input for Design	A31 Manage Legal Relations
A22	<u>Manage Public Relations</u>	A32 Review Project Management Plans	A32 Manage Public Relations
A23	<u>Manage Stakeholders</u>	A33 Negotiate GMP	A33 Manage Stakeholders
A24	<u>Manage Civil Rights (DBE, Local, Veterans, and so on)</u>	A34 Approve CM-GC Preconstruction Services Invoices	A34 Manage Civil Rights (DBE, Local, Veterans, and so on)
A25	<u>Manage Labor Agreements</u>	A35 Enact CM-GC Contract Modifications	A35 Manage Labor Agreements
A26	<u>Manage Materials</u>	A36 Manage CM-GC Documentation	A36 Manage Materials
A27	<u>Control and Inspect Work</u>		A32 Control and Inspect Work
A241	<u>Inspect Work for Conformance of Plans and Specifications</u>	A4 Administer CM-GC Construction	A341 Inspect Work for Conformance of Plans and Specifications
A241	<u>Review Completion of Punch List Items</u>	A41 Manage Legal Relations	A342 Review Completion of Punch List Items
A242	<u>Review Completion of Punch List Items</u>	A42 Manage Public Relations	A343 Document the Daily Work, Compliance, and Quality
A243	<u>Document the Daily Work, Compliance, and Quality</u>	A43 Manage Stakeholders	A444 Monitor RFIs
A244	<u>Manage RFIs</u>	A44 Manage CM-GC QA-QC	A445 Manage Submittal Process
A245	<u>Manage Submittal Process</u>	A45 Manage Labor Agreements	A446 Monitor CM-GC QA-QC
A246	<u>Monitor QA-QC</u>	A46 Manage Materials	A447 Manage Nonconformances
A247	<u>Manage Nonconformances</u>	A47 Control and Inspect Work	A448 Review Nonconformance Design Solution
A248	<u>Review Nonconformance Design Solution</u>	A48 Review Potential Additional Scope	A451 Review Shared Risk Contingency
A43		A49 Review State DOT Risk Contingency	A452 Review Supplemental Agreements
A28	<u>Execute Supplemental Agreements</u>	A50 Execute Supplemental Agreements	A453 Execute Supplemental Agreements
A251	<u>Receive Change Order</u>	A51 Receive Change Order	A351 Receive Change Order
A252	<u>Estimate Cost and Time Adjustments</u>	A52 Estimate Cost and Time Adjustments	A352 Estimate Cost and Time Adjustments
A253	<u>Negotiate Cost and Time Adjustments at Site Level</u>	A53 Negotiate Cost and Time Adjustments at Site Level	A353 Negotiate Cost and Time Adjustments at Site Level
A254	<u>Review Change Order</u>	A54 Review Change Order	A354 Review Change Order
A255	<u>Execute Change Order</u>		

D-B-B IDEF Model Framework		CM-GC IDEF Model Framework		D-B IDEF Model Framework	
<u>A29 Resolve Disputes</u>		A45 <u>Execute Change Order</u>		A355 <u>Execute Change Order</u>	
A210 <u>Measure Progress and Pay Contractor</u>		A46 <u>Resolve Disputes</u>		A34 <u>Resolve Disputes</u>	
A271 <u>Receive Contractor Invoice</u>		A46 <u>Measure Progress and Pay Contractor</u>		A35 <u>Measure Progress and Pay Contractor</u>	
A272 <u>Review Payment Invoice</u>		A481 <u>Receive Contractor Invoice</u>		A371 <u>Receive Contractor Invoice</u>	
A273 <u>Execute Payment</u>		A482 <u>Review Payment Invoice</u>		A372 <u>Review Payment Invoice</u>	
A211 <u>Acquire Project Completion Documentation</u>		A483 <u>Execute Payment</u>		A373 <u>Execute Payment</u>	
A212 <u>Ensure As-Builts are Being Developed by Contractor</u>		A47 <u>Acquire Project Completion Documentation</u>		A36 <u>Acquire Project Completion Documentation</u>	
		A48 <u>Ensure As-Builts are Being Developed by Designer and CM/GC</u>		A37 <u>Ensure As-Builts are Being Developed by Design-Builder</u>	
A4 <u>Administer D-B Closeout</u>		A51 <u>Conduct Final Inspection</u>		A4 <u>Administer D-B Closeout</u>	
A31 <u>Conduct Final Inspection</u>		A511 <u>Perform Inspection</u>		A41 <u>Conduct Final Inspection</u>	
A311 <u>Perform Inspection</u>		A512 <u>Review Punch List Work</u>		A411 <u>Perform Inspection</u>	
A312 <u>Review Punch List Work</u>		A52 <u>Review Final Turnover Documentation</u>		A412 <u>Review Punch List Work</u>	
A32 <u>Review Final Turnover Documentation</u>		A521 <u>Review As-Built Plans</u>		A42 <u>Review Final Turnover Documentation</u>	
A321 <u>Review As-Built Plans</u>		A522 <u>Review Contractor Turnover Documentation</u>		A421 <u>Review As-Built Plans</u>	
A322 <u>Review Contractor Turnover Documentation</u>		A523 <u>Review Contractor Payments</u>		A422 <u>Review Contractor Turnover Documentation</u>	
A33 <u>Review Invoice for Final Payment</u>		A53 <u>Review Invoice for Final Payment</u>		A423 <u>Review Contractor Payments</u>	
A34 <u>Review Corrective Action Completion</u>		A54 <u>Review Corrective Action Completion</u>		A43 <u>Review Invoice for Final Payment</u>	
A35 <u>Execute Contractor Release</u>		A55 <u>Execute Contractor Release</u>		A44 <u>Review Corrective Action Completion</u>	
A36 <u>Conduct Contractor Evaluation and Lessons Learned</u>		A56 <u>Conduct Contractor Evaluation and Lessons Learned</u>		A45 <u>Execute Contractor Release</u>	
		A57 <u>Execute Warranties</u>		A46 <u>Conduct Contractor Evaluation and Lessons Learned</u>	
				A47 <u>Execute Warranties</u>	

Note: ROW = right-of-way; n = indication of when an activity is repeated multiple times (i.e., Meeting 1, Meeting 2, Meeting n); DBE = disadvantaged business enterprise; RFI = request for information.

of values) and preliminary project plans are then updated. D-B-B, D-B, and CM-GC all follow similar processes for **Activity A1 Administer Alignment**. However, each delivery model is different in its execution. For example, in D-B-B the owner has an initial kickoff meeting with the design team. The owner does not hold a preconstruction or kickoff meeting with the construction team until the design is complete and the construction contract is awarded. In contrast, D-B and CM-GC allow the contractor to participate with the owner and designer at the beginning of the project in the kickoff meeting and intermittently throughout the project in alignment meetings. CM-GC and D-B alignment meetings often occur at the completion of each design-construction package. For CM-GC, **Activity A1 Administer Alignment Between CM-GC, Designer, and Owner** occurs when the project plans advance from approximately 0 percent–30 percent to approximately 30 percent–60 percent of design completion and involves team integration of the state DOT, contractor, and designer. For D-B, **Activity A1 Administer Alignment Between Design–Builder and DOT** involves more alignment of the state DOT's and the contractor's preliminary plans, highlighting the differences in the timing of contractor involvement.

Activity A2 Administer Design is an activity for the contractor in a D-B and CM-GC. A contractor in a D-B-B does not use this activity, since design is 100 percent complete when the D-B-B construction contract is awarded. For both D-B and CM-GC in **Activity A2 Administer Design**, the owner reviews the design work packages for overall requirements compliance. Design outputs are design completion paperwork; environmental, utilities, and permitting restrictions; added scope; and work packages required to perform the construction services. This model allows for multiple work package development and completion. In CM-GC, the design tasks are led by the owner's design consultant. However, in D-B these tasks are led by the contractor.

Activity 3 Administer Preconstruction Activities covers the contractor's preconstruction services and is unique to CM-GC. This includes the CM-GC's input on the design and project management plans and negotiation of the GMP. In D-B, the contractor provides the same preconstruction services as in CM-GC, but the designer is part of the contractor's team.

Administer Construction (i.e., D-B-B Activity 2, CM-GC Activity 4, and D-B Activity 3) is an activity shared by all three delivery methods. The output of this activity is a completed construction project. Most of the activities under **Administer Construction** are similar across D-B-B, CM-GC, and D-B. However, there are some differences in risk assignment, contingency funds, and roles during QA-QC.

Finally, **Administer Project Closeout** (i.e., D-B-B Activity 3, CM-GC Activity 5, D-B Activity 4) takes all applicable project documentation from the design, preconstruction, and construction and closes out the job. Similar to the construction activity, there is very little difference between the three delivery model closeouts. D-B and CM-GC may have multiple work packages producing a series of closeouts. However, some D-B and CM-GC projects may include warranties that extend contractor involvement into operations.

The research team used the D-B and CM-GC models during the case study phase. First, case study interviews collected information from the state agencies about the process used to either confirm or modify the models presented here. Second, the models were used to help the research team prompt discussion about processes that the state agencies may not have brought up in the case study interviews. Third, the models helped the research team document and organize constraints and mechanisms uncovered during the case studies. Finally, the process in the model was the basis for the tools and methods that became the content for the D-B and CM-GC guidebooks.

4.5 Summary

The newly developed IDEF models were used to guide the case studies described in Task 4. The questions that were asked helped guide case study interviews and identify similarities and differences between the three delivery methods. The findings from the case studies also acted as validation for the draft models, reinforcing their accuracy through discussions with state agency members. These models also served as an outline for the final guidebooks, as the chapters are structured around the alignment, design, preconstruction, construction, and closeout phases.

CHAPTER 5

Case Study Project Selection

5.1 Introduction

Task 4 of this research project involved a case study approach to gather information about state agency tools and methods. The team applied a methodologically rigorous approach to select a diverse set of 30 projects representing a variety of project sizes for CM-GC and D-B. The final distribution of case studies is shown in Table 5.1. This chapter will explain the research team's case study project selection process.

5.2 Data Collection Process

As an initial step for data collection, the research team developed and administered an online survey to request project names and details for potential case studies. The research team contacted 56 ACM experts in 56 agencies nationwide, in Canada, and in Puerto Rico, including the 50 states; the District of Columbia; Ontario, Canada; Colorado Bridge Enterprise; and the FHWA Central and Western Federal Lands Highway Divisions. The experts' names and contact information were presented to the NCHRP project panel for review. The panel provided valuable feedback with regard to the best individuals to contact in their respective states.

The survey questionnaire asked 12 distinct questions to gather the following information:

- State or agency name,
- Project name,
- Project or contract number,
- Contract type,
- Primary facility type,
- Project type,
- Estimated dollar value of construction,
- Approximate construction start date,
- Construction stage in summer of 2017,
- Approximate or estimated project finish date,
- Project contact (name, email address, and phone number), and
- Additional comments.

The survey was administered using the *Qualtrics* online survey software platform. It allowed the research team to identify 70 projects that fit the project selection criteria developed for this research. The responses represent 32 agencies distributed across the United States, which indicates a response rate of 57 percent. Figure 5.1 shows the geographical distribution of the agencies

Table 5.1. Distribution of selected projects.

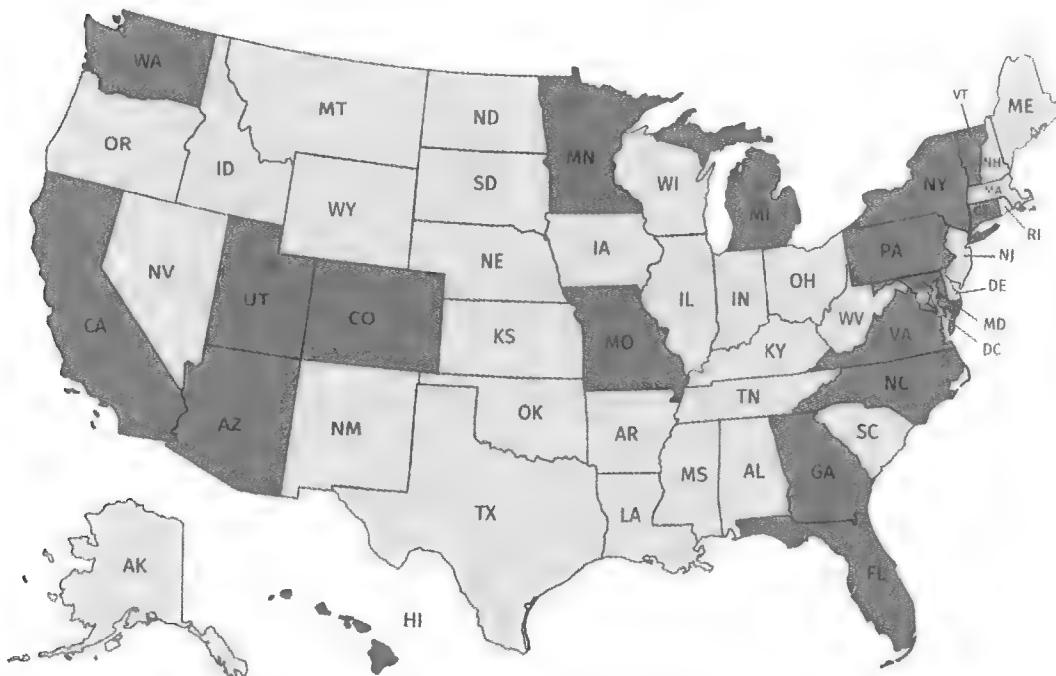
Delivery Method	Size		
	<\$10 million	≥ \$10 million–≤ \$50 million	>\$50 million
D-B	6 Projects	6 Projects	7 Projects
CM-GC	0 Projects	6 Projects	5 Projects

that was used for the final list of case studies (i.e., states that responded to the research team's case study requests and had projects that fit the team's desired size and delivery method).

5.3 Project Selection

Initially, the research team wanted to select 30 case studies with the distribution shown in Figure 5.2. For both CM-GC and D-B, the research team attempted to select five projects from each size category, ranging from less than \$10 million to greater than \$50 million. However, no CM-GC projects of less than \$10 million in size were found. This category was removed, and the team distributed five more projects between the remaining categories to reach the desired total of 30 projects. The final distribution is shown in Table 5.1.

Most projects selected were complete or nearing completion, allowing agency teams to more accurately gauge project success and access project team members with recent knowledge. Post-award contract administration practices were examined in retrospect for the earlier phases of these projects. A complete list of the case studies can be seen in Tables 5.2 and 5.3.

**Figure 5.1. Geographical distribution of case studies.**

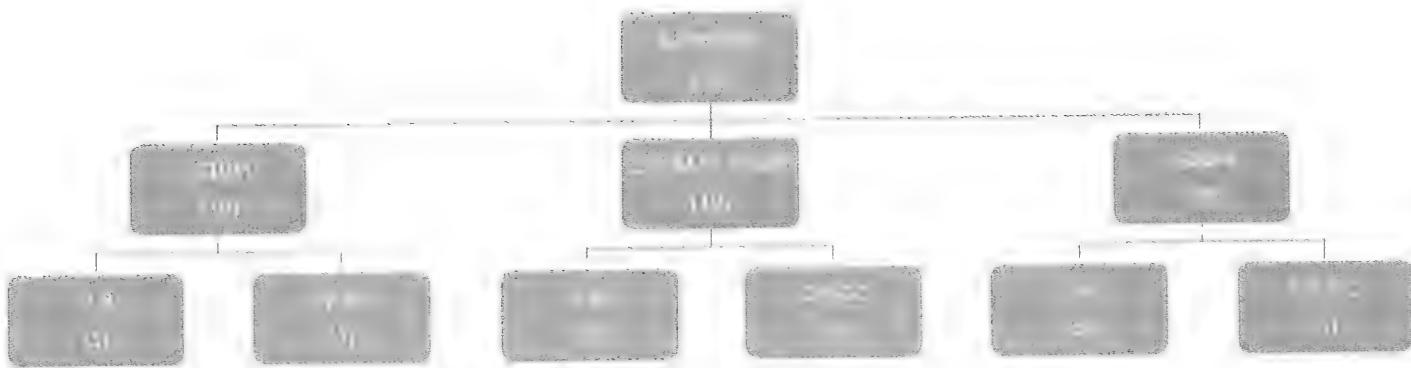


Figure 5.2. Initial case study distribution.

Table 5.2. Design-build case studies.

Case Study No.	Agency	Project Name	Contract Type	Primary Facility Type	Project Type	Dollar Value	Con. Start Date
Design-Build <\$10 million							
1	Pennsylvania DOT	West 4th Street Bridge	Design-Build	Bridge	Rehabilitation/Reconstruction	\$3M	Spring 2016
2	Florida DOT	SR 90 Traffic Signal Update	Design-Build	ITS	Rehabilitation/Reconstruction	\$4M	Feb 2016
3	Florida DOT	I-75(SR 93A)	Design-Build	ITS	Rehabilitation/Reconstruction	\$3M	Jan 2017
4	Virginia DOT	Braddock and Pleasant Valley Intersection Improvements	Design-Build	Road	Rehabilitation/Reconstruction	\$6M	Apr 2015
5	Georgia DOT	SR-299 Bridge over I-24	Design-Build	Bridge	Rehabilitation/Reconstruction	\$7M	Aug 2016
6	Michigan DOT	US-2 Iron Mountain	Design-Build	Road	Rehabilitation/Reconstruction	\$2M	March 2017
Design-Build \$10 million to \$50 million							
7	FHWA Central Federal Lands Highway Division	Lahaina Bypass 1B-2	Design-Build	Road, Bridge, Drainage	New Construction/Expansion	\$39M	Jan 2017
8	Arizona DOT	Grand-Bell Traffic Interchange	Design-Build	Road, Bridge, Other	New Construction	\$42M	Jan 2016
9	Connecticut DOT	Route 8 Design-Build	Design-Build	Road, Bridge, Drainage	Rehab/Recon	\$36M	Jun 2015
10	Missouri DOT	St. Louis District Safety	Design-Build	Road, Bridge, Drainage, ITS	New Construction/Expansion	\$24M	Jul 2017
11	New York State DOT	Wellwood Bridge	Design-Build	Bridge	Reconstruction	\$20M	Spring 2016
12	Vermont Agency of Transportation	I-89 in Milton	Design-Build	Bridge	Reconstruction	\$23M	Fall 2013
Design-Build >\$50 million							
13	Colorado DOT	I-25-Cimarron Design-Build	Design-Build	Road, Bridge, Drainage, ITS	Rehab/Recon	\$72M	Mar 2015
14	North Carolina DOT	Business 40 (Salem Parkway)	Design-Build	Road, Bridge	New Construction	\$99M	Fall 2017
15	Maryland DOT State Highway Administration	MD 404-US 50 to East of Holly Road	Design-Build	Road, Bridge	New Construction/Expansion	\$105M	Jun 2016
16	Caltrans	Devore Interchange	Design-Build	Road, Bridge	Reconstruction	\$208M	Dec 2012
17	Florida DOT	E2U46 I-95 @ I-295 Interchange	Design-Build	Road	Reconstruction	\$177M	July 2016
18	Georgia DOT	Northwest Corridor Project	Design-Build	Road, Bridge, Drainage, ITS	New Construction/Expansion	\$600M	Oct 2014
19	Washington State DOT	I-405, NE 6th Street to I-5-NB Hard Shoulder Running and ETL Improvement	Design-Build	Road, Drainage, ITS	Rehabilitation/Reconstruction	\$155M	Feb 2012

Note: Con. = construction; SR = state route; ITS = intelligent transportation system; NB = northbound; ETL = express toll lane.

Table 5.3. Construction manager-general contractor case studies.

Case Study No.	Agency	Project Name	Contract Type	Primary Facility Type	Project Type	Dollar Value	Con. Start Date
Construction Manager-General Contractor \$10 million to \$50 million							
20	Colorado DOT	I-70 Vail Underpass	CM-GC	Road, Bridge	New Construction/Expansion	\$31M	Oct 2015
21	Colorado DOT	US 6 and 19th Interchange	CM-GC	Road, Bridge, Drainage	New Construction/Expansion	\$25M	Feb 2016
22	Colorado DOT	I-25/Arapahoe CM-GC	CM-GC	Road, Bridge, Drainage, ITS	Rehabilitation/Reconstruction	\$50M	May 2016
23	FHWA Central Federal Lands Highway Division	South Fork Smith River Road	CM-GC	Bridge	Rehabilitation/Reconstruction	\$15M	Aug 2013
24	Caltrans	I-215/Barton Road Interchange	CM-GC	Road, Bridge	Reconstruction	\$47M	Nov 2017
25	Utah DOT	SR-108; SR-127 to SR-107	CM-GC	Road	Reconstruction/Expansion	\$50M	Mar 2017
Construction Manager-General Contractor >\$50 million							
26	Minnesota DOT	Winona Bridge	CM-GC	Bridge	New Construction/Expansion, Rehabilitation/Reconstruction	\$147M	Aug 2014
27	Arizona DOT	Ina Road Traffic Interchange-GMP 1	CM-GC	Road	New Construction/Expansion, Rehabilitation/Reconstruction	\$124M	July 2016
28	Colorado DOT	SH 82/Grand Avenue Bridge	CM-GC	Road, Bridge	New Construction/Expansion	\$75M	Jan 2016
29	Minnesota DOT	TH 53	CM-GC	Road, Bridge	New Construction/Expansion	\$156M	Nov 2015
30	Colorado DOT	E-470 Widening–Parker to Quincy	CM-GC	Road, Bridge, Drainage	New Construction/Expansion	\$90M	Spring 2016

Note: SH = state highway; TH = trunk highway.

5.4 Summary

The case study approach to this research project resulted in analysis of 30 projects from 18 state agencies. These construction projects were executed using D-B or CM-GC contracting methods, and sizes ranged from \$2 million to \$600 million. The diversity in project size, contracting method, and state agencies allowed the research team to conduct a thorough investigation and identify a variety of contract administration tools and methods used to deliver the projects.

CHAPTER 6

Case Study Interview Protocol

6.1 Introduction

The main objective of Task 4 was to conduct multiple case studies of alternative contracting method projects delivered by agencies. The intent was to analyze, summarize, and document the post-award contract administration methods and tools that state agencies used on the previously identified D-B and CM-GC projects (see Chapter 5). This chapter describes how the research team conducted the case studies.

6.2 Case Study Process

In preparation for each case study, the research team administered a short questionnaire to collect the following data prior to the interview:

- Project attributes, in addition to those originally provided in the project selection questionnaire (see Chapter 5);
- Key post-award contract administration tools used in various phases of the project;
- Key personnel for interview (e.g., project manager, project engineer, and QA-QC manager); and
- Key contact information.

The pre-interview questionnaire further prepared the research team ahead of the interview. It informed the decision whether to conduct a full interview for a specific project based on research fitness, availability of post-award contract administration tools, and availability of project personnel to participate in an interview.

The interview consisted of several open-ended questions organized by the major activities identified in the research team's IDEF process. For each activity, the respondents were asked to walk through their contract administration process and to share a method or tool used for this activity, if applicable. These tools varied from items such as a checklist and a software solution to a high-level framework. In order to receive comprehensive feedback, the research team asked clarifying questions or brought up areas in the IDEF model that the agency did not mention in their initial responses. The research team used the IDEF model structure to prompt questions at all levels, as described in this section.

The target duration for each interview was approximately 2 hours. In most cases, multiple team members from a single project joined the same interview. When this was not possible, the research team asked the respondents to gather information from other team members before or after the interview was completed.

6.3 Case Study Questions

The following outline shows the general format and flow of the D-B case study process. Where appropriate, the outline highlights how this layout differed between D-B and CM-GC projects. Again, to mitigate response bias from agency representatives, the questions and topics were intentionally open-ended. Questions were used to guide the case studies but not to limit them.

1. Introductions:

- a. Thank you ...
- b. Is it okay to record our conversation today?
- c. Introduce researchers and agency personnel involved in the interview.

2. Goal of research project:

Discuss the motivation behind this research and data the research team is collecting. Present the following:

- a. **Guidebooks:** The University of Colorado Boulder and Arizona State University are developing two AASHTO post-award contract administration guidebooks:
 - One for design-build (D-B) and
 - One for construction manager-general contractor (CM-GC).

Your DOT can benefit from this project in two ways. First, if one or more of your tools are selected, your DOT will be recognized as a leader of best practices. Second, the manuals will make tools from other agencies available to your DOT.

To make these guides as relevant as possible, we are reaching out to you and other DOT representatives to identify D-B and CM-GC **contract administration methods and tools** that DOTs are finding effective. We have chosen your project because it fits the characteristics chosen for this research.

- b. **Methods and Tools:** We will be asking you open-ended questions concerning the contract administration **methods and tools** that you have found effective on this specific project. If you have processes, methods, or tools that you have found effective on other projects please let us know, but specify that they were not used on this specific project. One of the main goals of this interview is to gather these tools today or in a follow-up. We appreciate you sharing with us any documents that are used as tools.

TOOLS DEFINED.

For this case study, a tool is a document or event that supports the execution of the project by helping to perform a task.

Background for the Research Team

Strategy defined:

A strategy is a plan of action intended to accomplish a specific goal. Strategies typically address a specific problem and are formulated to address a problem's root cause.

Method defined:

The strategy is implemented through a method. A method is a means or manner of procedure, especially a regular and systematic way of accomplishing something. The method must support the strategy.

Tool defined:

A method is then implemented using a tool. A tool is something used in the performance of an operation.

We would like to know about informal or formal tools you use, either personally developed or externally provided, such as:

- Templates for meeting agendas or meeting minutes,
- Excel spreadsheet templates,
- Basic guidelines given by coworkers—superiors and so on,
- Checklists,
- Flow charts,
- Events or meetings,
- Etc.

Additionally, we would like to understand:

- **Who** is involved with each activity (individuals and organizations);
- Any **guidance** you use to inform the use of a tool (websites, publications, agency manuals, federal guidebooks, etc.);
- **Strategies and processes** you use to guide the use of tools or methods; and
- Any **constraints** that control the process (environmental restrictions, utilities, permits, etc.).

3. Project description: Please briefly describe the targeted project: project size, project type, project location, any unusual occurrences that may have made the project unique or an outlier (i.e., Acts of God/Force Majeure, extreme delays, extreme additions of scope, unusual stakeholders, etc.).

Construction can generate a lot of documents and records. How would you describe your project documentation on a scale from Excellent—Average—Could be Better?

If needed, ask:

I will list off some documents, and you can respond “yes” or “no” as to whether you use these and High, Average, Low as to the level of completeness/thoroughness of the record keeping. Examples are RFI logs, submittal logs, inspection logs, punch lists, change orders, progress payments, risk analysis, innovation tracking, third-party coordination, long lead-time procurement, early work packages, etc.

4. D-B activities: The four highest-level activities we identified for design-build were

- Administer alignment between the D-B and DOT,
- Administer design of a D-B project,
- Administer preconstruction services of a CM-GC Project (**CM-GC Only**),
- Administer construction of a D-B project, and
- Administer closeout for a D-B project.

- a. The heart of this interview focuses on these four main activities just mentioned. These activities may overlap in time. We will plan to spend about 20 minutes on each of the four sections.
- b. (*Show interviewees a graphic of this level*). For consistency across interviews, I will go through a list of scripted questions. At times I may redirect or move us forward as needed.
- c. Do you have any questions or clarifications on any of these?

5. Administer alignment between D-B and DOT seems to be an important feature of D-B. It includes coming to an agreement on roles, responsibilities, and processes; plans for moving forward and functioning as a team; guidelines for the team; and project goals. For a D-B project, this would happen between the design-builder and the owner.

- a. Do you have any questions or clarifications regarding this activity?
- b. We will now ask about the tools used in the activities comprising administer alignment between D-B and DOT. (*Researcher goes through each activity listed below with the same question*).
- c. Are there any tools or methods your agency used to facilitate **Conduct Kickoff Meeting**? (e.g., agendas, checklists, rubrics, training, or stipend).
 - i. *Researcher records all stated tools.*
 - ii. *If there are any tools that the researcher is aware of from literature review, IDEF model, or previous case studies, and that the interviewee did not bring up, the researcher will ask whether or not the interviewee is aware of the tool and about its effectiveness.*

- **Conduct Kickoff Meeting**
- **Administer Team Alignment Meeting**
- **Align Project Plans**
 - Align Stakeholder Management Plans;
 - Agree upon Cash Flow, Schedule of Values, and Schedule;
 - Review Quality Management Plan and Risk Management Plan;
 - Align Construction Implementation Plans with D-B and DOT;
 - Execute Partnering Plan and Align Team Integration; and
 - Develop Project Plan Package.

6. **Administer design of a D-B project** includes overseeing the completion of the design, ensuring compliance to specifications, and ability to meet the project goals per the contract.

- a. Do you have any questions or clarifications regarding this activity?
- b. We will now ask about the tools used in the activities comprising administering design of a D-B project. (*Researcher goes through each activity with the same question*).
- c. Are there any tools or methods your agency used to facilitate **Ensure design compliance**? (e.g., agendas, checklists, rubrics, training, or stipend).
 - i. *Researcher records all stated tools.*
 - ii. *If there are any tools that the researcher is aware of from literature review, IDEF model, or previous case studies, and that the interviewee did not bring up, the researcher will ask whether or not the interviewee is aware of the tool and about its effectiveness.*
- d. **Ensure design compliance**
 - Ensure environmental compliance,
 - Manage utilities and permits,
 - Manage right-of-way (ROW) and temporary construction easements,
 - Ensure functional requirements, and
 - Ensure schedule requirements.

- **Manage work package coordination**
- **Review design package**
- **Approve design invoice**
- **Manage design documentation**
- **Enact contract modifications which impacts design**

7. **(CM-GC Only) Administer preconstruction services of a CM-GC project** includes overseeing input that the contractor provides during the design process.

- a. Do you have any questions or clarifications regarding this activity?
- b. We will now ask about the tools used in the activities comprising administer preconstruction services of a CM-GC project. (*Researcher goes through each activity with the same question*).
- c. Are there any tools or methods your agency used to facilitate **Review CM-GC Input for Design**? (e.g., agendas, checklists, rubrics, training, or stipend).
 - i. *Researcher goes through entire list of unique activities and records all stated tools.*
 - ii. *If there are any tools that the researcher is aware of from literature review, IDEF model, or previous case studies, and that the interviewee did not bring up, the researcher will ask whether or not the interviewee is aware of the tool and about its effectiveness.*

- **Review CM-GC input for design**
- **Review project management plans**
- **Negotiate GMP (CAP)**
- **Approve CM-GC preconstruction services invoices**
- **Enact CM-GC contract modifications**
- **Manage CM-GC documentation**

8. **Administer construction of a D-B project** includes ensuring the D-B firm successfully builds what is agreed upon in the contract.

- a. Do you have any questions or clarifications regarding this activity?
- b. We will now ask about the tools used in the activities comprising administering construction of a D-B project. (*Researcher goes through each activity with the same question*).
- c. Are there any tools or methods your agency used to facilitate **Manage Legal Relations?** (e.g., agendas, checklists, rubrics, training, or stipend).
 - i. *Researcher records all stated tools.*
 - ii. *If there are any tools that the researcher is aware of from literature review, IDEF model, or previous case studies, and that the interviewee did not bring up, the researcher will ask whether or not the interviewee is aware of the tool and about its effectiveness.*

- **Manage Legal Relations**
- **Manage Public Relations**
- **Manage Materials**
 - Sample and Verify Materials
 - Test Materials
 - Certify Materials
- **Control and Inspect Work**
 - Inspect Work for Conformance of Plans and Specifications
 - Review Completion of Punch List Items
 - Document the Daily Work, Compliance, and Quality
 - Monitor D-B QA-QC
 - Manage nonconformances
 - Review nonconformance design solution
- **Execute Supplemental Agreements**
 - Receive change order
 - Estimate cost and time adjustments
 - Negotiate cost and time adjustments at site level
 - Review change order
 - Execute change order
- **Resolve disputes**
- **Measure progress and pay contractor**
 - Receive contractor invoice
 - Review payment invoice
 - Execute payment
- **Acquire project completion documentation**
- **Ensure as-builts are being developed by design-builder**

d. Additional questions:

- i. How does the owner's roles and responsibilities change for quality control?
- ii. How does the owner's roles and responsibilities change for measure progress and pay contractor?
- iii. Please describe how shared and owner contingencies are determined and how they are used during construction.

9. **Administer closeout of a D-B project** includes performing all of the tasks required to ensure the job is properly closed per contractual obligations and documents are retained per DOT requirements.

- Do you have any questions or clarifications regarding this activity?
- We will now ask about the tools used in the activities comprising administer closeout of a D-B project. (*Researcher goes through each activity with the same question*).
- Are there any tools or methods your agency used to facilitate **Conduct Final Inspection?** (e.g., agendas, checklists, rubrics, training, or stipend).
 - Researcher goes through entire list of unique D-B activities and records all stated tools.*
 - If there are any tools that the researcher is aware of from literature review, IDEF model, or previous case studies, and that the interviewee did not bring up, the researcher will ask whether or not the interviewee is aware of the tool and about its effectiveness.*

- **Conduct final inspection**
 - Perform inspection
 - Review punch list work
- **Review final turnover documentation**
 - Review as-built plans
 - Review contractor turnover documentation
 - Review contractor payments
- **Review invoice for final payment**
- **Review corrective action completion**
- **Execute contractor release**
- **Conduct contractor evaluation and lessons learned**
- **Execute warranties**

10. We would like to ask you a few questions about innovations that may have occurred on your D-B project. Innovations would include methods, materials, or processes used on the project that are not ordinarily used.

- Did any innovations occur on this project? What was the innovation?
- At what phase of the project did the innovation occur? (0–30%, 31%–60%, 61%–90%, 91%–100%, or construction?)
- Did early contractor involvement influence each innovation? If so, how?

11. **Conclusion:**

- Did we miss any agency activities or tools that you used on this project or similar projects?
- For a DOT starting out in D-B, is there any tool you would highly recommend to them?
- That brings us to the conclusion of our interview. Is there anything else you would like to share about the tools you use to administer this D-B project?
- We will be following up with you via email to request and gather some of the specific tools your team talked about today.
- Thank you.

6.4 Case Study Follow-Up

After the case study interviews, the research team sent a follow-up email to all attendees, thanking them for their participation. At this time, the research team also requested copies of any documents that were discussed but not provided during the interview. Typically, these documents were anything that would help the research team better understand the project [e.g., request for qualifications (RFQs), RFP, or submittals] or the tools used to execute it (e.g., templates, checklists, or agendas).

In some cases—as the research team was developing tool descriptions—interviewees were contacted again to provide feedback on the status of the tool description. This follow-up was used to clarify questions about the tool and to ensure accuracy.

6.5 Summary

These case studies were conducted to learn more about the specific tools and methods used by state agency project teams to effectively deliver D-B and CM-GC highway construction projects. The research team developed the case study interview protocol based on the IDEF models. The research team conducted the interviews in a way that encouraged unprompted and unbiased responses by agency team members. This process was crucial for the development of the tools presented in these guidebooks.

Agency Contract Administration Tools

7.1 Introduction

The identification and presentation of contract administration tools for D-B and CM-GC projects are key contributions of these guidebooks. For the purpose of this research project, a tool is defined as

A tactic or process relating to D-B contract administration, such as checklists, spreadsheets, guidelines, and structured meetings.

Although the tools take on many forms and accomplish a variety of objectives, their core function remains the same. This chapter discusses tool identification, selection, development, and examples.

7.2 Tool Identification

The tools presented in these guidebooks were identified during the case study interviews discussed in Chapter 6. When learning about the detailed processes used during the execution of these D-B and CM-GC projects, the research team identified tools that were used to perform specific operations.

To be considered for these guidebooks, the tools identified also had to be unique to D-B or CM-GC—or at least modified to fit these delivery methods. If an agency or team had a tool that was used on projects regardless of the delivery method, then it was not considered specific to ACMs. However, if a tool was used on D-B-B projects but modified to fit more appropriately with D-B or CM-GC, then it was considered for these guidebooks. After a tool was identified, the research team would request specific documentation or detailed descriptions on the function of the tool, why it was created and used, when it was used most effectively, and how to most appropriately use it.

In some instances, similar tools were identified on multiple case studies from different agencies or on different teams within the same agency. This allowed the research team to obtain multiple examples of how the tool was implemented on projects and gain more insight on the specific benefits. Some agencies had different names for certain tools or processes, or they implemented them in a different manner. However, if the tools performed the same function or operation, the research team created one comprehensive tool description for the guidebooks.

These instances also provided multiple examples to be included with the tools. Multiple tool examples allowed agencies less familiar with the tools to understand their function and processes them more clearly. This also allowed agencies to tailor the tools to fit more appropriately within their current system or standards.

7.3 Initial Tool Selection Survey

After the case study interviews were completed, a survey was presented to the consultant team and experienced practitioners to test the applicability and effectiveness of the identified tools.

Survey Participants

This survey was distributed to a list of 20 experienced practitioners who agreed to work with the research team. These individuals were deeply involved in post-award contract administration of projects delivered using ACMs. It was determined that their experience would provide useful insight into the effectiveness and appropriateness of the identified tools. Of the 20 practitioners who received the questionnaire, 16 were able to provide their responses within the given time frame.

Survey Layout

The original 36 identified tools were separated into three categories: Team Alignment Tools, Design Tools, and Construction Tools. A brief description of each tool was provided to ensure that the participants were familiar with the tool and its purpose. The tool description also explained whether the tool was compatible with CM-GC projects, D-B projects, or both project types.

After each tool was described, the first question asked was, “*Is this tool effective enough to include in the guidebook for Post-Award Contract Administration?*” Participants were asked to select one of the following answers:

- Yes
- No
- I do not feel comfortable reviewing this tool.

If the participant responded “Yes,” the participant would move on to answer more questions regarding this tool. If the participant selected “No” or “I do not feel comfortable reviewing this tool,” the participant would move on to the next tool description. Participants that responded “Yes” to the first question would then be asked, “*Is this an appropriate tool for the following project complexities?*” The selection options were presented to participants in a matrix (Figure 7.1).

	No	Neutral	Yes
Non-Complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Moderately Complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 7.1. Project complexities matrix.

Based on their own experience with ACM projects and the descriptions of the tools, the participants were asked to select if each tool was appropriate for non-complex, moderately complex, and complex projects. The following definitions were provided regarding project complexities:

Complex (Major) Projects

- New highways or major relocations,
- New interchanges,
- Capacity adding or major widening,
- Major reconstruction (4R, 3R with multiphase traffic control),
- Congestion management studies required, and
- Environmental impact statement or complex environmental assessment required.

Moderately Complex Projects

- 3R and 4R projects that do not add capacity,
- Minor roadway relocations,
- Non-complex bridge replacements with minor roadway approach work, and
- Categorical exclusion or non-complex environmental assessment required.

Non-Complex (Minor) Projects

- Maintenance betterment projects;
- Overlay projects, simple widening without right-of-way (or very minimum right-of-way take), or little or no utility coordination;
- Non-complex enhancement projects without new bridges (e.g., bike trails); and
- Categorical exclusion.

(Note: 3R = resurfacing, restoration, rehabilitation; 4R = new construction or reconstruction).

Next, the participants were asked, “*Is this an appropriate tool for the following project sizes?*” Similar to the previous question, the selection options were presented as a matrix (Figure 7.2).

The project sizes were presented in the form of contract dollar amounts ranging from less than \$10 million to more than \$50 million.

Finally, participants were given the option to provide any additional comments about the tool presented. These comments could be regarding the description of the tool, their experience with the tool, or a justification for their answers to any of the questions.

Results

After all participants who were able to give responses had completed the survey, it was necessary to analyze the data. Of the 36 tools included in the survey, none were eliminated from

	No	Neutral	Yes
<\$10M	1	1	1
\$10M to \$50M	1	1	1
>\$50M	1	1	1

Figure 7.2. Project size matrix.

Table 7.1. Question 1 results.

Percent Consensus	Number of Tools
$\geq 70\%$	36
$\geq 70\% \text{ to } < 80\%$	6
$\geq 80\% \text{ to } < 90\%$	6
$\geq 90\% \text{ to } 100\%$	24

Table 7.2. Classifications.

Percent Consensus	Classification
< 50%	Not recommended
$\geq 50\% \text{ to } < 80\%$	Consider case by case
$\geq 80\% \text{ to } 100\%$	Recommended

consideration for the guidebooks based on the responses provided. A summary of the responses to the first question, “*Is this tool effective enough to include in the guidebook for post-award contract administration?*” can be seen in Table 7.1.

The responses to the second question, “*Is this an appropriate tool for the following project complexities?*” were divided into three classifications, seen in Table 7.2.

The purpose of these classifications was to share the recommendations of the practitioners with the agencies that were considering using these tools. If a tool was classified as “Not recommended” for a project complexity, then the practitioners felt that it would be ineffective, not appropriate, or not worth the resources to implement with that type of project. When a tool was classified as “Consider case by case,” this meant the tool should be considered, but depending on the details of the project could still be effective or ineffective. It was at the discretion of the agency to determine if the tool would function properly with a project of that complexity. Finally, if a tool was classified as “Recommended” for a project’s level of complexity, then the practitioners felt that this tool should be used for the corresponding complexities. Details regarding the classifications for each tool can be found with the tool descriptions. A summary of the results can be seen in Table 7.3.

Table 7.4 shows that as projects became more complex, the practitioners recommended the use of more tools to execute the project.

Table 7.3. Classification versus complexity summary.

Classification	Project Complexities		
	Non-Complex	Moderately Complex	Complex
Not Recommended	6 tools	0 tools	0 tools
Consider Case by Case	23 tools	4 tools	0 tools
Recommended	7 tools	32 tools	36 tools

Table 7.4. Classification versus size summary.

Classification	Project Complexities		
	<\$10 million	\$10 million to \$50 million	>\$50 million
Not Recommended	2 tools	0 tools	0 tools
Consider Case by Case	20 tools	2 tools	0 tools
Recommended	14 tools	34 tools	36 tools

The results of the third and final question, “*Is this an appropriate tool for the following project sizes?*” were classified using the same ranges as the complexities in the second question as shown in Table 7.2. Again, the details regarding the classifications can be seen in each tool description, and a summary of the results can be seen in Table 7.4.

Similar to the results of the complexity question, the practitioners felt that as the contract value of a project increases, the number of tools used should increase, as well.

7.4 Final Tool Selection and Examples

The survey results showing the most appropriate project sizes and complexities were incorporated into the tool descriptions, which can be found in the guidebooks. However, some tools were removed after the results of the survey because of a lack of or low-quality examples. The research team felt that tools without high-quality examples would be unclear and potentially misunderstood by guidebook users. Therefore, before any of the removed tools are considered for future use, they should be further developed and tested by state transportation agencies.

The research ultimately incorporated 28 tools for *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design-Build Delivery*, and 32 tools are included in *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 2: Construction Manager-General Contractor Delivery*. The provided tool descriptions were generated using the information obtained during the case studies, feedback from the practitioners–reviewers, and comments collected from the initial tool selection survey.

7.5 Summary

The tools presented in these guidebooks were created and used by state transportation agencies across the country to administer contracts for D-B and CM-GC projects. The tool descriptions and recommended use—depending on project size and complexity—were generated throughout a process involving case studies of 30 projects and 13 agencies and the feedback and practitioner opinions from the research team’s group of practitioners. These tools have proven effective in administering contracts for D-B and CM-GC projects and should be considered by all state transportation agencies for future use. The provided examples are meant to be used for guidance, but tailoring should also take place to ensure that the tools fit specifically within each agency’s established system.

CHAPTER 8

Guidebook Development and Testing

8.1 Introduction

This chapter presents how the guidebooks were developed and tested. These guidebooks were created to help state transportation agencies better administer the construction administration phase of D-B and CM-GC highway projects. With agency employees as the intended audience, it was important for the success of these guidebooks to be reviewed and critiqued by professionals familiar with general transportation agency contract administration practices and, specifically, with ACMs. Through several rounds of submissions and feedback, the guidebooks developed into comprehensive and navigable documents that will prove beneficial to agency employees at all levels.

8.2 Guidebook Structure and Layout

When developing these guidebooks, it was important for the research team to include all of the gathered information and present it in a way that would be most useful to the readers. The intended audience for these guidebooks is agency employees who are involved in the contract administration and execution of D-B and CM-GC construction projects. Not only will these guidebooks be useful for organizational-level employees who are looking to improve their ACM programs but also for project-level employees looking to more effectively deliver their projects.

To most effectively organize the guidebooks, the research team determined that chapters should be organized by key project phase and that each chapter should be able to stand alone. This design ensures that users at a given point in project development or administration who are looking for specific topics or information do not need to read the entire guidebook. Readers should be able to quickly navigate to the desired chapter and find the relevant content.

After several iterations and rounds of feedback, the following outlines were agreed upon for each guidebook.

NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design-Build Delivery

- Chapter 1: Introduction
- Chapter 2: Overarching Contract Administration Strategies
- Chapter 3: Pre-Award Phase Administration
- Chapter 4: Alignment Phase Administration
- Chapter 5: Design Phase Administration
- Chapter 6: Construction Phase Administration

- Chapter 7: Closeout Phase Administration
- Chapter 8: Guidebook Implementation
- References and Bibliography
- Glossary
- Appendix A: Contract Administration Tools
- Appendix B: Case Studies

NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 2: Construction Manager-General Contractor Delivery

- Chapter 1: Introduction
- Chapter 2: Overarching Contract Administration Strategies
- Chapter 3: Pre-Award Phase Administration
- Chapter 4: Alignment Phase Administration
- Chapter 5: Design Phase Administration
- Chapter 6: Preconstruction Phase Administration
- Chapter 7: Construction Phase Administration
- Chapter 8: Closeout Phase Administration
- Chapter 9: Guidebook Implementation
- References and Bibliography
- Glossary
- Appendix A: Contract Administration Tools
- Appendix B: Case Studies

Multiple reviews by members of the research team, consultant team, peer review team, and NCHRP project panel helped verify that these outlines most clearly presented the guidebook topics in an organizational structure that promoted easy navigation and readability. The outlines for each guidebook are identical, with the only exception being the addition of the “Preconstruction Phase Administration” chapter in the CM-GC guidebook. This phase is unique to CM-GC projects.

Introduction Chapter

The first chapter for each of these guidebooks is an introduction, meant for the readers who want to learn more about the content and organization of the guidebooks. The introductory chapter includes the following topics:

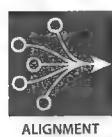
- Overview,
- Design-Build and Construction Manager-General Contractor Background,
- Industry Need for a Guidebook,
- Key Guidebook Terms,
- Guidebook Development,
- Overview of Post-Award Phases and Tools, and
- Reader’s Guide.

Reading this chapter is not necessary for readers to understand all of the guidebooks’ content, but it provides a clear understanding of what they can expect to find.

Overarching Contract Administration Strategies Chapter

This chapter introduces overarching strategies to aid successful D-B and CM-GC contract administration. Five overarching CM-GC strategies and five overarching D-B strategies were

identified after a comprehensive examination of all the tools, an analysis of agency ACM manuals, and an analysis of themes from the case studies. Four of these strategies are consistent between both D-B and CM-GC contract administration. However, two strategies are unique to either D-B or CM-GC. The overarching strategies are:



Alignment Strategy (Both)—Establish clear project goals and create productive relationships within the agency and between the agency and CM-GC or D-B team members.



Scope Strategy (Both)—Ensure that the project scope and responsibilities are understood and agreed upon by all parties.



Design Quality Strategy (D-B)—Ensure design quality through active participation in design reviews and accurate implementation of the RFQ–RFP requirements.



Preconstruction Services Quality Strategy (CM-GC)—Ensure quality of preconstruction services through active participation in design reviews and verifying competitive pricing of estimates.



Construction Quality Strategy (Both)—Promote quality during construction, and enforce the requirements of the D-B or CM-GC contract.



Construction Efficiency Strategy (Both)—Implement a system that increases efficiency during construction and aligns with roles and contractual responsibilities.

These strategies were identified to assist at both the program and project levels. At the ACM program level, agencies are encouraged to use these strategies to guide the development of policies and practices. At the project level, the strategies will help guide successful implementation of the existing tools, the creation or addition of new contract administration tools, and, ultimately, the successful administration of D-B and CM-GC projects.

Phase Administration Chapters

Process modeling for these guidebooks (discussed in Chapter 4) revealed that contract administration processes vary from agency to agency, and even within agencies. However, key processes were found on all D-B and CM-GC projects across agencies. The five phases identified for D-B projects included the following:

- Pre-Award Phase,
- Alignment Phase,
- Design Phase,
- Construction Phase, and
- Closeout Phase.

The six phases identified for CM-GC projects included the following:

- Pre-Award Phase,
- Alignment Phase,
- Design Phase,
- Preconstruction Services Phase,
- Construction Phase, and
- Closeout Phase.

The guidebook chapters that follow are organized by project administration phases. The chapters discuss the activities and processes that agencies conducted during each of the phases and identify which contract administration tools can be used during these phases. Although the guidebooks are specifically targeted towards post-award contract administration, the research team felt it was important to include a pre-award phase administration chapter. The team determined that although tools may be executed during post-award phases, it is important that they are initiated in the pre-award phase to ensure that their requirements are clearly described in the RFP and associated documents.

Guidebook Implementation Chapter

The implementation chapter discusses implementation goals at the organization and project levels of agencies. The organizational-level goals focus on introducing and embedding new D-B or CM-GC contract administration tasks and processes into the organization. The project-level goals focus on introducing and embedding new tasks and processes into a D-B or CM-GC project.

The implementation goals were developed through information gathered during the case study interviews and feedback provided by the research team's group of peer reviewers and consultants. A summary of these implementation goals is shown in Table 8.1. The research from this project suggests that establishing and achieving these implementation goals will assist in improving an agency's execution of D-B and CM-GC projects.

References and Bibliography

This section follows the main text and provides key sources that are cited in the guidebooks for the readers to explore in more detail.

Table 8.1. Implementation goals.

Agency Level	Implementation Focus	Implementation Goals
Organization	Strategies	<ol style="list-style-type: none"> 1. Commit to long-term implementation. 2. Assign roles and responsibilities. 3. Assess and adjust current strategy. 4. Communicate agency direction for D-B contract administration. 5. Train organizational team members. 6. Develop a method to measure and evaluate performance.
Project	Tools	<ol style="list-style-type: none"> 1. Assess existing tools. 2. Identify appropriate tools based on project characteristics. 3. Train project team members. 4. Test new tools. 5. Evaluate the performance of tools.

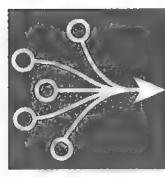
Glossary

This section provides key terms as found in the literature, state DOT manuals, and case studies.

Appendix A: Contract Administration Tools

The tools discussed throughout the guidebooks are fully described—with their corresponding examples—in Appendix A. Each tool description is organized according to the format listed here:

- Tool number and name
 - The number is for quick identification of the tool in this guidebook, and the name is intended to reveal the nature of the tool.
- Brief description
 - This includes one or two sentences to give the reader a quick overview of what to expect in the remaining description.
- What is it?
 - This contains an expanded description of the tool.
- Why use it?
 - This explains the purpose of the tool and lists its potential benefits. This section also discusses the contract administration strategies that the tool addresses.



ALIGNMENT



SCOPE

DESIGN
QUALITYCONSTRUCTION
QUALITYCONSTRUCTION
EFFICIENCY

- When to use it?
 - This section has a table indicating in what contract administration phase(s) the tool could be used. The table also summarizes guidance from up to 16 experts—including industry, academic, and agency leaders and practitioners—who reviewed each tool. These D-B experts provided feedback regarding whether the tool is considered useful (i.e., recommended, considered case by case, or not recommended) for various D-B project sizes (<\$10 million, \$10 million–\$50 million, or >\$50 million) and complexities (non-complex, moderately complex, or complex). Note that “recommended” does not mean required. Agencies should use their own discretion on whether a tool is appropriate for a particular project.
- How to use it?
 - This provides information about how to implement the tool successfully in the project.
- Synthesis of examples
 - This summarizes tips and implementation guidance found when analyzing the case study project examples. This section is included when applicable.
- Examples
 - The examples are real projects that have used the tools. Examples include text and tables that show how an agency used the tool on a recent project. Sometimes multiple examples are provided to show alternative ways of implementing a tool. This variety is intended to encourage readers to adapt the basic tool to meet their own agency and project needs.
- References
 - This provides a list of written and online resources where the reader can find more information about the tool. Since some of these tools are relatively new, in some instances there may not be many resources beyond this guidebook.

The previous guidebook chapters introduced the tools and their benefits. But as tools are discussed, readers should reference the corresponding name and number in Appendix A to gain the most complete understanding of how, when, and why to implement these tools.

Appendix B: Case Studies

This appendix lists the case studies upon which the guidebook format was based and where the tools were found. It provides basic information and project characteristics.

8.3 Guidebook Testing

The research team completed the testing of the guidebooks by sending drafts and conducting interviews with knowledgeable state transportation agencies identified during the case study phase. These interviews focused on discussing sections of the guidebooks with state transportation agency teams. Asking each agency to review a subset of the guidebook sections was intended to generate in-depth feedback and reduce the required work for agency participants. The following agencies participated in testing the guidebooks:

- Colorado Department of Transportation
- Arizona Department of Transportation
- California Department of Transportation
- Minnesota Department of Transportation

The guidebooks were sent to the agency team members 1 to 2 weeks prior to the scheduled testing interview to allow adequate time to review the content. Specifically, agency team members were asked to focus on the clarity and readability, quality of the content, and the navigability of the documents. Agency members were asked to use the guidebooks as if they were preparing to implement the tools and strategies being presented on an upcoming or current project. This allowed the research team to understand how easy it was for individuals to learn the details necessary to implement the new information and to find the content they were looking for.

These interviews confirmed that the content in the guidebooks was useful for agency team members. The feedback also led to an improved format, which helped the research team create a clearer presentation of the information, thus increasing the reader's ability to easily navigate the documents.

The final point of validation was through the NCHRP project panel members' review. At several stages throughout the development of the guidebooks, drafts were submitted to the NCHRP project panel members for review. The panel carefully reviewed and commented on the drafts as they were submitted. The research team responded to all of the panel member's comments through several iterations of the guidebooks, which led to the improved final drafts.

8.4 Summary

This chapter described how the guidebooks were developed and how the testing process helped create the final drafts. Agency and panel members identified in the early stages that the content was important and necessary, but identifying the best way to present the content took several iterations. These reviews and cycles of feedback resulted in comprehensive guidebooks that are easy to read and navigate. The research team believes that the guidebooks will provide information to improve the contract administration for D-B and CM-GC highway construction projects.

CHAPTER 9

Conclusions and Recommendations

9.1 Conclusions

The research addressed the primary research question, “What are the most effective tools for post-award contract administration of D-B and CM-GC projects?” The research produced two practitioner guidebooks in AASHTO format, based on the identification and analysis of the tools in use on a range of ACM projects for post-award contract administration of D-B and CM-GC projects. As an additional scope of work proposed by the research team, the research also produced an update to the *AASHTO Guide for Design-Build Procurement*.

The state-of-practice review produced the following key items, which define the context for ACM in state highway agencies and validate the need for the guidebooks.

- State legislation for D-B is more widespread than for CM-GC.
- State manuals covering D-B are more widespread than for CM-GC.
- Documents mention various specific tools and processes used by state agencies for ACM contract administration. However, there was no comprehensive documentation of these tools.
- Tools and processes used in D-B-B are reported as being used in D-B and CM-GC. However, the stakeholder roles and timing may have been different for ACM projects.
- Tools and processes included both tangible documents (e.g., a cost-savings matrix) and recommended practices (e.g., confidential one-on-one meetings).

The IDEF modeling and in-depth case studies defined a set of ACM phases: Alignment, Design, Preconstruction Services (CM-GC only), Construction, and Project Closeout. These phases serve as an organization for the guidebooks to present strategies and tools. State agencies can use these phases to organize more comprehensive ACM guidance manuals, implement and develop ACM tools, and, ultimately, measure the performance of their ACM programs.

To aid in implementation, the research produced five overarching CM-GC strategies and five overarching D-B strategies through a comprehensive examination of all the tools, an analysis of agency ACM manuals, and an analysis of themes from the case studies. Four of these strategies are consistent between both D-B and CM-GC contract administration. However, two strategies are unique to either D-B or CM-GC. These strategies will assist agencies at both the program and project level. At the ACM program level, the strategies will help guide the development of policies and practices. At the project level, the strategies will help guide successful implementation of the existing tools, the creation or addition of new contract administration tools, and the successful administration of D-B and CM-GC projects.

The research ultimately incorporated 28 tools for *NCHRP Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 1: Design-Build Delivery*, and 32 tools are included in *NCHRP*

Research Report 939: Guidebooks for Post-Award Contract Administration for Highway Projects Delivered Using Alternative Contracting Methods, Volume 2: Construction Manager-General Contractor Delivery. The tool descriptions were generated using the information obtained during the case studies, feedback from the practitioners—reviewers, and comments collected from the initial tool selection survey. These tools have proven effective in administering contracts for D-B and CM-GC projects, and all state transportation agencies should consider them for future use.

9.2 Challenges to Implementation

The guidance that this research provides has the potential to increase the efficiency and effectiveness of ACM project delivery. Advancement of ACM contract administration will require a willingness of highway agencies to formalize their approaches and measure their effectiveness. It has taken more than a decade to implement the *AASHTO Guide for Design-Build Procurement* and to develop a common approach between states. Most industry members would agree that there is still work to be done. The publication of the CM-GC and D-B contract administration guidebooks will promote consistency and efficiency in state practices, but experience with D-B procurement shows that it will take a decade or more to fully implement the contract administration practices. It will take the efforts of highly motivated individuals and champions of change before the industry can fully realize the impacts of these advances.

The challenges of implementing alternative ACM contract administration strategies and tools are similar to the implementation of any process changes across large public or private organizations. State highway agencies must consider several challenges when deploying this research. At a minimum, the following challenges exist:

- Lack of widespread experience with ACM contract administration across agencies, particularly CM-GC experience;
- Lack of state-level training and guidance manuals to promote consistency; and
- Lack of performance measures and targets to measure ACM program success.

NCHRP and FHWA have a role to play in addressing these challenges. Without national guidance, state agencies will produce individual solutions to these implementation challenges. Additional research and guidance can increase the pace of implementation and promote efficiency.

9.3 Recommendations

The limitations of this research point toward additional research topics and implementation actions. The NCHRP project panel was forward-looking in its request to develop an implementation approach and training materials with this research. These items are ready for deployment, but they need testing and refinement. The research also revealed the need to develop methods to measure ACM performance for continuous improvement, which do not exist. The following are critical topics that NCHRP and FHWA should consider for immediate implementation:

1. **Test and deploy training materials.** This research developed draft training materials relating to the strategies and tools in the guidebooks. However, the scope and funding for the research did not include testing or implementation. The research team strongly recommends a systematic approach to testing these training materials and implementing them with five to six lead states. This approach will allow refinement of the material and distribution to all state highway agencies.

2. **Test guidebook implementation on pilot projects.** All of the tools in the guidebooks are in use by state highway agencies. However, the overarching strategies and the approach to selecting specific tools are new. Testing of the guidebook approach on pilot projects and publishing the results as case studies would aid in the speed and effectiveness of guidebook implementation.
3. **Develop, test, and deploy ACM performance measures.** The research revealed a lack of a comprehensive framework, performance measures, and targets for measuring ACM performance. CM-GC and D-B projects are selected for specific goals that might not be achieved through traditional delivery methods. Therefore, ACM projects and programs should use a unique set of performance measures. National research to develop a common set of ACM performance measures and targets will expedite and improve implementation.
4. **Continue to develop new ACM tools where agencies have needs.** During this research, gaps where there are a lack of ACM tools were discovered. Some areas to consider include project closeout, risk management, quality management, constructability input, and work packaging. Researchers could work with agencies to develop practical tools for ACM contract administration to meet felt needs of agencies.

The research team strongly recommends that NCHRP—potentially with the cooperation of FHWA—implement these four recommendations. Implementation will require partnership from AASHTO and a small group of state highway agencies. The research team is prepared to assist with implementation, and states that would be willing to participate are easily identifiable from the data collection in this research study. These recommendations provide opportunities to accelerate the diffusion of ACM knowledge.

References and Bibliography

AASHTO. *Guide for Consultant Contracting*. Washington, D.C., 2008a.

AASHTO. *Guide Specifications for Highway Construction*, 9th Edition. Washington, D.C., 2008b.

Alaska Department of Transportation and Public Facilities. *Guidebook for Design-Build Highway Project Development*, 1st Edition. December 2005. <http://dot.alaska.gov/comm/assets/DB/Chapters.pdf>. Accessed October 15, 2018.

Alleman, D., A. Antoine, M. Schrilla, and K. Molenaar. The Use and Performance of Alternative Contracting Methods on Small Highway Construction Projects. In *Proceedings of the International Conference on Sustainable Design, Engineering, and Construction*, Procedia Engineering, Spain, 2015.

Alleman, D., A. Antoine, D. Papajohn, and K. Molenaar. Desired Versus Realized Benefits of Alternative Contracting Methods on Extreme Value Highway Projects. In *Proceedings of the Resilient Structures and Sustainable Construction, International Structural and Engineering Society* (E. Pellicer, J. M. Adam, V. Yepes, A. Singh, and S. Yazdani, eds.), ISEC Press, Fargo, North Dakota, 2017.

Arizona Department of Transportation. *Design-Build Procurement and Administration Guide*, 3rd Edition. December 2007. <https://azdot.gov/docs/default-source/construction-group/designbuildguide.pdf?sfvrsn=0>. Accessed February 10, 2018.

Arizona Department of Transportation. *ADOT Construction Manager at Risk (CMAR) Process Guide*, 2nd Edition. September 2014. https://www.azdot.gov/docs/default-source/construction-group/cmars_manual_100510.pdf?sfvrsn=2. Accessed October 15, 2018.

Arkansas State Highway and Transportation Department. *Design-Build Guidelines and Procedures*, Revision 1. September 2015. https://www.arkansashighways.com/consultant_services/publications/Design_Build%20Procedures_Final.pdf. Accessed October 15, 2018.

California Department of Transportation. *Alternative Procurement Guide*. April 2008. <http://www.caltrans.ca.gov/design/idd/AlternativeProcurementGuide.pdf>. Accessed October 15, 2018.

California Department of Transportation. *Design-Build Demonstration Program Quality Manual Outline*. July 2013. <http://www.dot.ca.gov/design/idd/db/sac50-5/rfp/03-2F21U4-Exhibit-2A-Quality-Manual-Template.pdf>. Accessed October 15, 2018.

Chan, A. P. C. Evaluation of Enhanced Design and Build System: A Case Study of a Hospital Project. *Construction Management and Economics*, Vol.18, No. 7, 2000, pp. 863–871.

City of Seattle. *General Contractor/Construction Manager Contracting Guide*. Seattle Department of Finance and Administrative Services, Purchasing and Contracting Services Division, Seattle, Washington, 2011.

Colorado Department of Transportation. *Construction Manager/General Contractor Manual*. January 2015a. <https://www.codot.gov/business/designsupport/innovative/documents/cmgc-manual/view>. Accessed October 15, 2018.

Colorado Department of Transportation. *Innovative Contracting (Design-Build and CM/GC)*. 2015b. <https://www.codot.gov/business/designsupport/innovative-contracting-and-design-build>. Accessed July 31, 2017.

Colorado Department of Transportation. *Design-Build Manual: Innovative Contracting Program*. September 2016. <https://www.codot.gov/business/designsupport/innovative-contracting-and-design-build/2016-cdot-d-b-manual>. Accessed February 10, 2018.

Construction Management Association of America. *An Owner's Guide to Project Delivery Methods*. McLean, VA., 2012.

Design-Build Institute of America. State Advocacy. 2016. <http://www.dbia.org/advocacy/state/Pages/default.aspx>. Accessed December 21, 2016.

District of Columbia Department of Transportation. *Design-Build Manual*. May 2014. [https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/DC%20DB%20Manual%20Final%2005_23_2014%20\(3\).pdf](https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/DC%20DB%20Manual%20Final%2005_23_2014%20(3).pdf). Accessed October 15, 2018.

Ellis, R. D., Z. Herbsman, and A. Kumar. *Evaluation of the FDOT Design/Build Program*, Final report. Department of Civil Engineering, University of Florida, Gainesville, 1991.

Federal Register. Design-Build Contracting: Final Rule. Vol. 67, No. 237, December 10, 2002, pp. 75901–75935. <https://www.fhwa.dot.gov/programadmin/contracts/dbfinal.cfm>. Accessed December 30, 2016.

Federal Register. Construction Manager/General Contractor Contracting: Final Rule. Vol. 81, No. 232, January 3, 2017, pp. 86928–86947. <https://www.federalregister.gov/documents/2016/12/02/2016-28977/construction-managergeneral-contractor-contracting>. Accessed December 31, 2016.

FHWA. *Design-Build: FHWA's Role in the Design-Build Program Under Special Experimental Projects No. 14 (SEP-14)*. 1996.

FHWA. *Design-Build Effectiveness Study*. 2006. <http://wwwcf.fhwa.dot.gov/reports/designbuild/designbuild0.htm>. Accessed December 27, 2016.

FHWA. *Alternative Contracting Methods (ACMs) Library*. 2016a. <http://www.fhwa.dot.gov/construction/contracts/acm/>. Accessed December 21, 2016.

FHWA. *Construction Program Guide: Construction Manager/General Contractor Project Delivery*. 2016b. <http://www.fhwa.dot.gov/construction/cqit/cm.cfm>. Accessed December 21, 2016.

FHWA. *Construction Program Guide: Special Experimental Project No. 14—Alternative Contracting*. 2016c. <http://www.fhwa.dot.gov/construction/cqit/sep14.cfm>. Accessed December 21, 2016.

FHWA. *Construction Manager/General Contractor*. 2016d. <http://www.fhwa.dot.gov/innovation/everydaycounts/edc-2/cmgc.cfm>. Accessed December 28, 2016.

FHWA. Every Day Counts: An Innovation Partnership with States. U.S. Department of Transportation, Washington, D.C., 2016e. <http://www.fhwa.dot.gov/innovation/everydaycounts/>. Accessed December 31, 2016.

Fisher, D. J., S. D. Anderson, and S. P. Rahman. Integrating Constructability Tools into Constructability Review Process. *Journal of Construction Engineering and Management*, Vol. 126, No. 2, March 2000, pp. 89–96. 10.1061/(ASCE)0733-9364(2000)126:2(89).

Francom, T., M. El Asmar, and S. T. Ariaratnam. Performance Analysis of Construction Manager at Risk on Pipeline Engineering and Construction Projects. *ASCE Journal of Management in Engineering*, Vol. 32, No. 6, 2016.

Gambatese, J., K. Dettwyler, D. Rogge, and L. Schroeder. *Oregon Public Contracting Coalition Guide to CM/GC Contracting*. Oregon Public Contracting Coalition, Portland, 2002. <http://www.deq.state.or.us/wq/loans/docs/CMGCGuide05.pdf>. Accessed December 14, 2016.

Georgia Department of Transportation. *Design-Build Manual*, Revision 4.2, October 2016. <http://www.dot.ga.gov/PS/DesignManuals/DesignGuides>. Accessed November 25, 2017.

Gransberg, D. D., and E. Windel. Communicating Design Quality Requirements for Public Sector Design/Build Projects. *Journal of Management in Engineering*, Vol. 24, No. 2, April 2008, pp. 105–110.

Gransberg, D. D., J. Datin, and K. Molenaar. *NCHRP Synthesis 376: Quality Assurance in Design-Build Projects*. Transportation Research Board of the National Academies, Washington, D.C., 2008. <https://dx.doi.org/10.17226/23222>.

Gransberg, D. D., and M. C. Loulakis. *NCHRP Synthesis 429: Geotechnical Information Practices in Design-Build Projects*. Transportation Research Board of the National Academies, Washington, D.C., 2010. <https://dx.doi.org/10.17226/22793>.

Gransberg, D. D., and J. S. Shane. *NCHRP Synthesis 402: Construction Manager-at-Risk Project Delivery for Highway Programs*. Transportation Research Board of the National Academies, Washington, D.C., 2010. <https://dx.doi.org/10.17226/14350>.

Gransberg, D. D., J. Shane, S. Anderson, C. Lopez del Puerto, K. Strong, and J. McMinimee. *NCHRP Project 10-85: A Guidebook for Construction Manager-at-Risk Contracting for Highway Projects: Interim Report*. Transportation Research Board of the National Academies, Washington, D.C., 2012.

Gransberg, D. D., J. Shane, J. Schierholz, S. Anderson, C. Lopez del Puerto, K. Strong, D. Pittenger, and J. McMinimee. *NCHRP Project 10-85: A Guidebook for Construction Manager-at-Risk Contracting for Highway Projects*, Final report. AASHTO, 2013.

Idaho Transportation Department. *Design-Build Manual*. January 2014. <https://apps.itd.idaho.gov/apps/manuals/DesignBuild/Design-BuildPrintable.htm>. Accessed October 15, 2018.

Illinois Department of Transportation. *Standard Documents for Design-Build Projects*. August 2007. <https://www2.illinois.gov/cdb/business/library/Documents/SD-DB2007.pdf>. Accessed October 15, 2018.

Lambert, J. H., R. K. Jennings, and N. N. Joshi. Integration of Risk Identification with Business Process Model. *Systems Engineering*, Vol. 9, No. 3, 2006, pp. 187–198. 10.1002/sys.20054.

Louisiana Department of Transportation and Development. *Design-Build Manual*. November 2012. http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Design-Build/DesignBuild%20Manuals/DOTD%20Design-Build%20Manual.pdf. Accessed October 15, 2018.

Maryland State Highway Administration. *Design-Build Manual*. January 2013. https://www.roads.maryland.gov/OHD2/SHA_Design-Build_Manual.pdf. Accessed October 15, 2018.

Massachusetts Department of Transportation. *Design-Build Procurement Guide*. December 2012. (Email correspondence). June 14, 2016.

Mayer, R. J. (ed.). *IDEFØ Functioning Modeling: A Reconstruction of the Original Air Force Report*. Knowledge Based Systems, Inc., College Station, Texas, 1990.

Michigan Department of Transportation. *Innovative Construction Contracting Guide*. March 2015. https://www.michigan.gov/documents/mdot/Innovative_Construction_Contracting_340000_7.pdf. Accessed October 15, 2018.

Miller, J. B., M. J. Garvin, C. W. Ibbs, and S. E. Mahoney. Toward a New Paradigm: Simultaneous Use of Multiple Project Delivery Methods. *Journal of Management in Engineering*, Vol. 16, No. 3, 2000, p. 58.

Minchin, E., L. Ptschelinzew, G. Migliaccio, U. Gatti, K. Atkins, and G. Hostetler. A Synthesis of Fast-Track Highway Construction Delivery in the U.S. Presented at CIB World Building Congress, Brisbane, Queensland, Australia, 2013.

Minchin, E., L. Ptschelinzew, G.C. Migliaccio, U. Gatti, K. Atkins, T. Warne, G. Hostetler, and S. Asiamah. *NCHRP Report 787: Guide for Design Management on Design-Build and Construction Manager/General Contractor Projects*. Transportation Research Board of the National Academies, Washington, D.C., 2014. <https://dx.doi.org/10.17226/22273>.

Minnesota Department of Transportation. *Innovative Contracting Guidelines*. December 2005. <http://www.dot.state.mn.us/const/tools/documents/Guidelines.pdf>. Accessed October 15, 2018.

Minnesota Department of Transportation. *Design-Build Manual*. August 2011. <http://www.dot.state.mn.us/designbuild/>. Accessed October 1, 2017.

Molenaar, K. R., A. D. Songer, and M. Barash. Public Sector Design-Build Evolution and Performance. *Journal of Management in Engineering*, Vol. 15, No. 2, 1999, pp. 54–62.

Molenaar, K. and D. Gransberg. Design-Builder Selection for Small Highway Projects. *Journal of Management in Engineering*, Vol. 17, No. 4, 2001, pp. 214.

Molenaar, K., D. Gransberg, S. Scott, D. Downs, and R. Ellis. NCHRP Project 20-7/Task 172: Recommended AASHTO Design-Build Procurement Guide. Transportation Research Board of the National Academies, Washington, D.C., 2005.

Montana Department of Transportation. *Alternative Contracting and Innovative Construction Guide*. February 2009. https://www.mdt.mt.gov/other/webdata/external/const/manuals_guidelines/innov_contr_guide.pdf. Accessed October 15, 2018.

Moor, W. C., and J. E. Bailey. *Information Systems in ADOT: Analysis of Intra-Function Flow, Design Support Needs, Existing Systems Utility and User Attitudes*. Arizona Department of Transportation, Report Number FHWA/AZ-84/205, Final Report, Volume II: Manual for Evaluation of Needs and Attitudes of EDP Users, Phoenix, Arizona, 1985.

Moving Ahead for Progress in the 21st Century Act. 2012.

Nevada Department of Transportation. *Pioneer Program Guidelines*, 2nd Edition. August 2013. <https://www.nevadadot.com/home/showdocument?id=4496>. Accessed October 15, 2018.

New York State Department of Transportation. *Design-Build Procedures Manual*. September 2005. <https://www.dot.ny.gov/divisions/engineering/design/dqab/dqab-repository/2011%20Design%20Build%20Manual%20%20Volume1%20of%205.pdf>. Accessed October 15, 2018.

North Carolina Department of Transportation. *Design-Build Policy and Procedures*. October 2011. <https://connect.ncdot.gov/letting/Design%20Build%20Resources/01.%20NCDOT%20Design-Build%20Policy%20and%20Procedures.pdf>. Accessed October 15, 2018.

Ohio Department of Transportation. *Design-Build Manual and Instructions for Completing the Scope of Services Form*. 2009. http://www.dot.state.oh.us/Divisions/ConstructionMgt/design-build/DesignBuild/Design_Build_scope_manual_4-17-09.pdf. Accessed October 15, 2018.

Pennsylvania Department of Transportation. *Publication 448 Innovative Bidding Toolkit*. 2013. <http://www.dot.state.pa.us/public/pubsforms/Publications/Pub%20448/Pub%20448.pdf>. Accessed October 15, 2018.

Pietroforte, R. and J. B. Miller. Procurement Methods for U.S. Infrastructure: Historical Perspectives and Recent Trends. *Building Research and Information*, Vol. 30, No. 6, 2002, pp. 425–434.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. 2007.

Sanvido, V. E. and M. D. Konchar. Project Delivery Systems: CM at Risk, Design-Build, Design-Bid-Build. *Construction Industry Institute*, Austin, Texas, 1998.

Schierholz, J. M. *Evaluating the Preconstruction Phase in a Construction Manager/General Contractor Project*. MS thesis. Iowa State University, Ames, 2012.

Sullivan, J., M. El Asmar, J. Chalhoub, and H. Obeid. Two Decades of Performance Comparisons for Design-Build, Construction Manager at Risk, and Design-Bid-Build: Quantitative Analysis of the State of Knowledge on Project Cost, Schedule, and Quality. *Journal of Construction Engineering and Management*, Vol. 143, No. 6, 2017.

Tennessee Department of Transportation. *Design–Build Standard Guidance*. January 2017. https://www.tn.gov/content/dam/tn/tdot/construction/design-build_projects/Design-Build_Guidance_01-31-17.pdf. Accessed October 15, 2018.

Transportation Equity Act for the 21st Century. 1998.

Utah Department of Transportation. UDOT Policy 08A-11: Design–Build Projects. August 2013a. <https://www.udot.utah.gov/main/uconowner.g?n=10489021922653084>. Accessed October 15, 2018.

Utah Department of Transportation. UDOT Policy 08A-12: Advertising and Awarding Design–Build Contracts. August 2013b. <https://www.udot.utah.gov/main/uconowner.g?n=10489114781660535>. Accessed October 15, 2018.

Utah Department of Transportation. *Construction Manager General Contractor Selection: Manual of Instruction*. June 2015. <https://www.udot.utah.gov/main/uconowner.g?n=24655430683638422>. Accessed October 15, 2018.

Utah Department of Transportation. *Design–Build Selection: Manual of Instruction*. October 2017. <https://www.udot.utah.gov/main/uconowner.g?n=24913107051249248>. Accessed October 15, 2018.

Vermont Agency of Transportation. *Alternative Technical Concepts*. March 2015a. https://vtrans.vermont.gov/sites/aot/files/contractadmin/documents/designbuild/Alternative%20Technical%20Concepts_0.pdf. Accessed October 15, 2018.

Vermont Agency of Transportation. *Design–Build Process for Project Managers*. February 2015b. <https://vtrans.vermont.gov/sites/aot/files/contractadmin/documents/designbuild/VTrans%20DB%20Process%20for%20Project%20Managers.pdf>. Accessed October 15, 2018.

Vermont Agency of Transportation. *English/Metric Construction Manual*. 2018. <https://outside.vermont.gov/agency/VTRANS/external/docs/construction/2018%20Construction%20Manual%20Addendum.pdf>. Accessed March 13, 2020.

Virginia Department of Transportation. *Design–Build Evaluation Guidelines*. May 2014. http://www.virginiadot.org/business/resources/DB_Evaluation_Guidelines_5-27-2014.pdf. Accessed October 15, 2018.

Virginia Department of Transportation. *Design–Build Procurement Manual*. April 2017. http://www.virginiadot.org/business/resources/APD_Docs/APD_Office_Page/DB_Procurement_Manual_-_Revised_April_2017.pdf. Accessed October 15, 2018.

Washington State Department of Transportation. *Guidebook for Design–Build Highway Project Development*. June 2004. http://www.wsdot.wa.gov/NR/rdonlyres/46196EB8-F9D0-4290-8F55-68786B1DA556/0/DesignBuild_GuidebookJun2004.pdf. Accessed April 13, 2018.

APPENDIX A

Alternative Contracting Methods State Legislation and Manuals

Table A.1. Alternative Contracting Methods state legislation [as of December 2016]

State	Design-Build Legislation	CM-GC Legislation
AL	SB 92; Al. Code § 23-1-40 and § 23-2-145	
AK	§ 36.30.200; 2 AAC 12.943; 2 AAC 12.933	AS 36.30.308
AZ	A.R.S. § 28-7363 to 28-7365; § 28-7703; § 34-602; § 41-2582; § 28-7363 -65	ARS § 28-7366; § 34-603
AR	Ark. Stat. Ann. § 27-67-2069(j)2)	
CA	Public Contract Code § 6820	AB 2498 Chapter 6.3 (commencing with Section 6700) to Part 1 of Division 2 of the Public Contract Code
CO	CRS § 24.101-103.203; 30-20-104; 43-1-1401 to 43-1-1403	CRS § 24-30-1401, et seq.; § 29-93-101
CT	2012 CT PA 70 § 1	Substitute Senate Bill No. 33, Public Act No. 12-70
DE	69 Del. Code Chapter 29; 29 Del. C. § 6907	
DC	D.C. Code § 2-356.01	
FL	FL. § 337.11; § 287.055	FL § 337.025
GA	O.C.G.A. § 32-2-78-80; § 32-2-81	
HI	HRS §§ 103D-303	
ID	Idaho Code § 67-2309; §67-5711A; § 40-904	Idaho Statutes § 40-905
IL	30 ILCS § 535/75; 630 ILCS § 5/25	
IN	Burns Ind. Code Ann. § 8-23-9-4; § 5-30-5-6	
IA	IA Code § 29A.57	
KS	Kan. Stat. §§ 75-37, 145	
KY	KRS §§ 45A.180; § 176.080; § 56.8161	

State	Design-Build Legislation	CM-GC Legislation
LA	La. Rev. Stat. § 33.2740.70; § 33.2740.27; § 48:250.2	RS 38:2225.2.4
ME	5 M.R.S.A. § 1743; 23 M.R.S.A. § 4244	
MD	MD State Finance and Procurement Code Ann. § 3-602 (g)(1)	
MA	ALM GL 6c § 63; ALM GL 149 §14	
MI	MCL §§ 18.1240 to 1250	Act 51, Public Acts 1951 Amended
MN	MSA §§ 383B.158 - 383B.1585; MSA §§161.3410 to 161.3428	Sec. 2. [161.3207]; CHAPTER 82-S.F. No. 745 Sec. 9. Minnesota Statutes 2012, section 13.72, amended
MS	Miss. Code Ann. §§ 31-7-13.1, 31-11-3(9); §§ 31-7-13.2; §§ 59-5-37; §§ 65-1-85(11); §§ 31-5-52	
MO	Mo. Rev. Stat § 227.107; SB 173/HB 430; HB 2376	HB 2376
MT	MCA § 60-2-111 to 112; § 60-2-137; § 18-2-501 to 503	
NE	LB 960; Nebraska Revised Statute 13-2901 to 2908; 13-2911 to 2914; 39-2811 to 2816; 39-2821 to 2824	Nebraska Revised Statute 13-2901 to 2905, 13-2909 to 2914, 39-2808 to 2811, 39-2817 to 2824
NV	NRS §§ 338.1711 to 338.1727; §§ 408.388; §§ 408.5471 to 408.549; §§ 408.3875 to 408.3886; 408.5471 to 408.549	NRS §§ 338.169
NH	N.H. RSA §§ 21-I: 80; §§ 228:4(c); §§ 228:4(d)	
NJ	N.J. Stat. § 27:25-11	
NM	HB 206 & SB 215; NMSA §§ 13-1-119.2	NMSA §§ 13-1-111; 13-1-124.5
NY	New York Investment Act, December 2011	
NC	NCGS §§ 143-64.31; §§ 136- 28-11; §§ 136-89; §§ 136-89.194	
ND	No design-build authority—NDCC 48-01.2-01	
OH	ORC Ann Chapter 153; HB 114	
OK	61 O.S. § 202.1	
OR	ORS. §§ 383.005-383.017; § 279A.050(3)(b); OTIA III—Oregon Transportation Investment Act	§ 279C.337
PA	62 PCSA §§ 322(2); 75 PSA § 9511; 74 Pa.C.S. § 9108	

State	Design-Build Legislation	CM-GC Legislation
PR	23 LPRA § 2910; 9 LPRA § 2004a-2004c	
RI	RIGL 37.2.27; 37.2.31; 180 RIGL 13; CRIR 10-05-004	Rule 8.11.3.3
SC	S.C. Code Ann. §§ 11-35-3005	
SD	Design-build is authorized for all public agencies. (SDCLA § 15-18b-20)	
TN	SB 2196 and HB 2253; T.C.A. § 54-1-119	Public Chapter No. 366
TX	Tex. Transpo. Code 223.242; Texas Gov't Code Ann. §§ 2166.251 to 2166.2531	
UT	UCA 63G-6a-1402; UCA §§ 63G-6-501-502, 503; Utah Admin Rule R916-3	Utah Code 63G-6a-1303; Utah Admin Rule R916-5
VT	19 V.S.A., Title 19, Ch.26; 19 V.S.A. § 10	
VA	Va. Code Ann. §§ 2.2-4306- 2.2-4308	
WA	RCW 39.10.270 to 280; 39.10.300; 47.20.780 to 785	Chapter 39.10 RCW
WV	W. Va. Code §§ 5-22A-1-11; §§ 17-2D-2	
WI	WS § 84.11(5)(n); § 13.48(19)	
WY	Wyo. Stat. § 6.6.101-107	
FLE (Fed. Lands East)	Title 23 Ch. 1 Sec. 112; Title 23 Vol. 1 Part 635	Public Law 112-142
FLC (Fed. Lands Central)	Title 23 Ch. 1 Sec. 112; Title 23 Vol. 1 Part 636	Public Law 112-143
FLW (Fed. Lands West)	Title 23 Ch. 1 Sec. 112; Title 23 Vol. 1 Part 636	Public Law 112-144

Table A.2. State Department of Transportation manuals for Alternative Contracting Methods [as of December 2016]

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
AL	—	—	—	Alabama DOT Construction Manual
AK	Guidebook for Design-Build Highway Project Development, 1st Ed., 2005	—	—	Alaska Construction Manual, 2014
AZ	Design-Build Procurement and Administration Guide, 3rd Ed., 2007	Arizona DOT Construction Manager at Risk Process Guide, 2nd Ed., 2014	—	Arizona DOT Construction Manual
AR	Design-Build Guidelines and Procedures, Rev. 1, 2015	—	—	Contractor Compliance Manual, 2011
CA	Policy Guidance Project Authorizations Under the Design-Build Demonstration Program, Res.G-09-09; Innovative Procurement Practice: Alternative; Procurement and Contracting Methods, Tasks 3.2 and 3.3, 2007; Caltrans Alternative Procurement Guide, 2008; Project Delivery Acceleration Toolbox: Improvement to the Project Delivery Process, 2014	Innovative Procurement Practice: Alternative, Procurement and Contracting Methods, Tasks 3.2 and 3.3, 2007; Caltrans Alternative Procurement Guide, 2008; Project Delivery Acceleration Toolbox: Improvement to the Project Delivery Process, 2014	Innovative Procurement Practice: Alternative; Procurement and Contracting Methods, Tasks 3.2 and 3.3, 2007; Caltrans Alternative Procurement Guide, 2008; Project Delivery Acceleration Toolbox: Improvement to the Project Delivery Process, 2014	Caltrans Construction Manual, 2014

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
CO	Design-Build Manual, Rev. 2014 (under current revision); Innovative Contracting Guidelines, 2015	Innovative Contracting Guidelines, 2015; Construction Manager-General Contractor Manual, 2015	Innovative Contracting Guidelines, 2015	Colorado DOT Construction Manual, 2016
CT	—	CM-GC Procurement Guidance Document for the Walk Bridge Project, Project No. 0301-0092, 2014	—	Connecticut DOT Construction Manual, 2011; Connecticut DOT Construction Contract Bidding and Award Manual, 2015
DC	Design-Build Manual, 2014	—	—	District of Columbia DOT Construction Management Manual, 2010
DE	—	—	—	Delaware DOT Construction Manual, 2006
FL	Project Selection Guidelines	—	—	Construction Project Administration Manual, 2013
GA	Design-Build Manual, Rev. 4.1, 2015	—	—	Georgia DOT Standard Specifications Construction of Transportation Systems, 2013
HI	—	—	—	Hawaii DOT 2005 Standard Specifications
ID	Design-Build Manual, 2014	—	—	Contract Administration Manual, 2016; Standard Specification for Highway Construction,

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
				2012; Constructability Review Guidelines, 2011
IL	Standard Documents for Design-Build Projects, 2007	—	—	Construction Manual, 2006; Standard Specifications for Road and Bridge Construction, 2016
IN	—	—	—	Indiana DOT Standard Specifications, 2016
IA	—	—	—	Construction Manual, 2001; Iowa DOT Standard Specification for Highway and Bridge Construction, 2015
KS	—	—	—	Construction Manual, 2014
KY	—	—	—	Construction Guidance Manual, Rev. 2016; 2012 Standard Spec with Supp. Spec April 2016
LA	Design-Build Manual, 2012	—	—	Construction Contract Administration Manual 2005; Standard Specifications for Roads and Bridges 2016
ME	—	—	—	Construction Manual, 2003
MD	Maryland Department of Transportation State Highway	—	—	Maryland State Highway Administration Office of

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
	Administration Design-Build Manual, 2013			Construction, Construction Manual, 2002
MA	Design-Build Procurement Guide, 2012	—	—	Construction Contract Administration Manual 2005; Standard Specifications for Roads and Bridges 2016
MI	Michigan DOT Innovative Construction Contracting Guide, 2015	Michigan DOT Innovative Construction Contracting Guide, 2015	Michigan DOT Innovative Construction Contracting Guide, 2015	Construction Manual, 2015
MN	Design-Build Manual, 2012; Innovative Contracting Guidelines, 2005	—	Innovative Contracting Guidelines, 2005	Construction Administration Manual, 2011; Standard Specification for Construction, 2016
MS	—	—	—	Construction Manual, 2016
MO	Brochure: Design-Build at Missouri DOT, 2014; web page: Category 139 Design-Build	—	—	Missouri Standard Specifications for Highway Construction, 2016; (Construction Manual discontinued and content integrated into the EPG database)
MT	Design-Build Guidelines, 2004; Alternative Contracting and Innovative Construction Guide, 2009	—	—	Materials Manual, 2016

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
NE	Brochure: Accelerated Project Delivery Methods	—	—	Construction Manual, 2002
NV	Pioneer Program Guidelines, 1st Ed., 2011	Pioneer Program Guidelines, 1st Ed., 2011	Pioneer Program Guidelines, 1st Ed., 2011	Construction Manual, 2016
NH	—	—	—	Construction Manual, 2006
NJ	—	—	—	Standard Specifications for Road and Bridge Construction, 2007, Updated 2016; Construction Procedures Handbook, 2011
NM	—	—	—	Standard Specifications for Highway and Bridge Construction, 2014
NY	Design-Build Procedures Manual, Rev. 2011	—	—	Steel Construction Manual, 3rd Ed., 2008, Updated 2013; Prestressed Concrete Construction Manual, 2000; Standard Specification: Construction and Materials, 2016
NC	Design-Build Policy and Procedures, 2011; Design-Build Submittal Guidelines for the North Carolina Turnpike Authority, 2009	—	—	Construction Manual
ND	—	—	—	Standard Specifications for Road and Bridge

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
				Construction, 2014; Construction Records Manual for 2014 Spec Book
OH	Design-Build Manual and Instructions for completing the Scope of Services form, 2009	—	—	Construction and Material Specifications, 2013
OK	—	—	—	Construction Manual
OR	Design-Build Low Bid 15-Step Project Delivery Process Summary, 2011; Design-Build Manual and Instructions for completing the Scope of Services form, 2009	—	—	Construction Manual, 2016
PA	Innovative Bidding Toolkit, Rev. 2011	—	Innovative Bidding Toolkit, Rev. 2011	Construction Manual, 2008
RI	—	—	—	Standard Specifications for Road and Bridge Construction, 2013
SC	South Carolina DOT Design-Build Project Development and Procurement Best Practices Memorandum, 2012	—	—	South Carolina DOT Construction Manual, 2004
SD	Website: Design-Build Procedures	—	—	South Dakota DOT Construction Manual
TN	Design-Build Standard Guidance, Rev. 2009	—	—	Standard Specifications for

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
				Road and Bridge Construction, 2015
TX	Texas DOT Design-Build Quality Assurance Program Implementation Guide, 2011	—	—	Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges, 2014
UT	Design-Build Project: Purpose, Policy, and Procedures, Utah DOT 08A-11, Rev. 2013	Utah DOT Construction Manager General Contractor Selection: Manual of Instruction, 2015	—	Utah DOT 2012 Standard Specifications for Road and Bridge Construction
VT	Design-Build Process for Project Managers, Rev. 2015	—	—	Vermont Agency of Transportation 2015 English/Metric Construction Manual [updated 2018]
VA	Design-Build Procurement Manual, Rev. 2011; Design-Build Evaluation Guidelines, 2014; Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects, 2012	—	—	Virginia DOT 2005 Construction Manual
WA	Guidebook for Design-Build Highway Project Development, 2004; Washington State DOT Design-Build Project Delivery Guidance	—	—	Washington State DOT Construction Manual, 2016

State	D-B Manuals and Policies	CM-GC Manuals and Policies	ACM Manuals	Construction Manuals
	Statement: Independent Assurance (IA) for Design-Build Projects, v.1, 2007			
WV	West Virginia Division of Highways Policies and Procedures Concerning Design-Build Projects	—	—	West Virginia DOT Construction Manual, 2002
WI	Facilities Development Manual (Ch. 3.1, sec. 17.5), 2014	Wisconsin DOT Bridge Manual, Ch. 7-Accelerated Bridge Construction, 2015	—	Wisconsin DOT Construction and Materials Manual
WY	—	—	—	Wyoming DOT Construction Manual, 2016

APPENDIX B

Case Study Summaries

Case Study 1. I-70 Vail Underpass (CM-GC), Colorado

Project Name: I-70 Vail Underpass

Name of Agency: Colorado Department of Transportation (Colorado DOT) and Town of Vail (TOV)

Location: Near mile marker 175 on I-70 between Main Vail and West Vail interchanges

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualification-Based Selection–Construction Agreed Price

Total Project Cost: \$31 million

Construction Schedule: October 2015–October 2017

Project Description: A joint effort between CDOT and TOV that utilized CDOT's RAMP program. This project constructed a two-lane underpass with two new bridges under I-70 that connect to the north and south frontage roads (Figure B1.1). Two single-lane roundabouts alleviated traffic congestion resulting from major development in the TOV. The project did not add additional I-70 exits/interchanges into the TOV. Sidewalks and retaining walls up to 18 ft. were constructed to help accommodate the lowering of the roadway. This project relieved congestion at the interchanges and prevented vehicles from queuing at the I-70 exits at Main and West Vail. Additionally, the work reduced repetitive local traffic movements by providing a direct connection between the core resort village areas and the West Vail mall area and residences that would otherwise use the interchanges. Furthermore, improvements enhanced multimodal transportation options within the TOV, including bus, pedestrian, and bicycle mobility. A summary of the initial tools for the investigation is shown in Table B1.1.

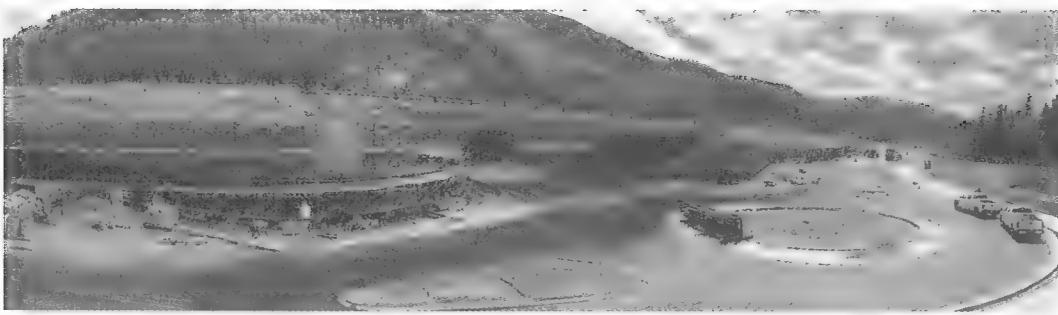


Figure B1.1. Vail underpass construction (Source: Colorado Department of Transportation).

Table B1.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities • Partnering
2. Administer CM-GC Design	<ul style="list-style-type: none"> • None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Innovation matrix • Risk pools • Cost approach • Cost-comparison spreadsheet • Interim pricing milestone and bid validation • ICE • Construction general conditions table for determining fee (in Colorado DOT manual)
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 2. US 6 and 19th Street Interchange (CM-GC), Colorado

Project Name: US 6 and 19th Street Interchange

Name of Agency: City of Golden and Colorado Department of Transportation (Colorado DOT)

Location: US Highway 6 and 19th Street in Golden, Colorado

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualification-Based Selection–Guaranteed Maximum Price with 11 competitively bid work packages

Total Project Cost: \$25 million

Construction Schedule: February 2016–September 2017

Project Description: This project constructed a two-lane 19th Street overpass over US 6 with on and off ramps (Figure B2.1). US 6 was widened to four lanes with pavement capacity to expand to six lanes in the future if traffic volumes warrant. Improvements included a multiuse paved trail and small park on top of the bridge with berms for noise barriers. An IGA has Golden maintaining the landscape and Colorado DOT maintaining the bridge. A summary of the initial tools for the investigation is shown in Table B2.1.



Figure B2.1. Rendering of US 6 and 19th Street Bridge in Golden, Colorado (Source: Colorado Department of Transportation).

Table B2.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • None
2. Administer CM-GC Design	<ul style="list-style-type: none"> • None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Innovation matrix • Risk pools • Cost-comparison spreadsheet • Construction general conditions table for determining fee (in Colorado DOT manual)
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 3. I-25–Arapahoe Interchange (CM-GC), Colorado

Project Name: I-25–Arapahoe Interchange

Name of Agency: Colorado Department of Transportation (Colorado DOT)

Location: Greenwood Village, Colorado at I-25 and Arapahoe Interchange

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualifications-Based Selection–Guaranteed Maximum Price

Total Project Cost: \$84 million (\$54 million construction services)

Construction Schedule: May 2016–July 2018

Project Description: The project included replacing the I-25 Bridge over Arapahoe Road. The bridge was lengthened to increase capacity on the interchange by adding dedicated turn lanes to the I-25 on ramps (Figure B3.1). Other components of the project included improving the intersections at Yosemite and Boston streets, adding a new frontage road to improve access to businesses in the northeast quadrant, and constructing a sound wall next to adjacent residences. The CM-GC contractor was Kraemer North America, the designer was David Evans and Associates/Hartwig & Associates, and the ICE was LS Gallegos. A summary of the initial tools for the investigation is shown in Table B3.1.

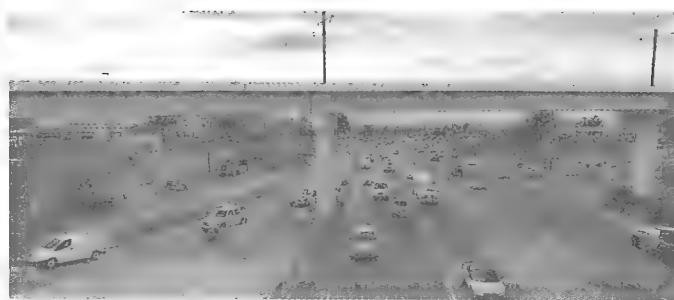


Figure B3.1. I-25–Arapahoe Interchange
(Source: Colorado Department of Transportation).

Table B3.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities • Partnering
2. Administer CM-GC Design	<ul style="list-style-type: none"> • None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Innovation matrix • Cost approach • Cost-comparison spreadsheet • ICE • Interim pricing milestone and bid validation
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 4. I-215 Barton Road Interchange (CM-GC), California

Project Name: I-215 Barton Road Interchange Reconstruction Project

Name of Agency: California Department of Transportation (Caltrans, District 8) with San Bernardino Associated Governments (SANBAG)

Location: I-215 at Barton Road in Grand Terrace

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualification-Based Selection–Guaranteed Maximum Price

Total Project Cost: \$47.5 million

Construction Schedule: Preconstruction services started August 2014. Construction anticipated November 2017–Spring 2020.

Project Description: This project proposes to demolish the existing Barton Road Overcrossing and construct a new Barton Road Overcrossing Box Girder Bridge and interchange (Figure B4.1). Work includes the realignment of existing on and off ramps, retaining walls, utility relocations, realignment of Commerce Way, new roundabout, and new road construction. The CM-GC is Myers–Rados, A Joint Venture. Caltrans will perform the design. A summary of the initial tools for the investigation is shown in Table B4.1.



Figure B4.1. Barton Road Interchange Project location (Source: California Department of Transportation).

Table B4.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities (table) • Informal discussions with functional groups and team members to clarify roles and expectations in CM-GC • Cost approach (Initial Approach to Cost Meeting: contract scope, App. B, section 2.2, establish assumptions on: baseline production rates; input standards for cost and schedule estimates; construction means and methods; communication of changes in scope, quantity, and phasing.) • Glossary of Preconstruction Terms: in contract scope, App. B, section 5.0 (obtained from web site) • Kickoff–Partnering meeting
2. Administer CM-GC Design	<ul style="list-style-type: none"> • Review response period: contract scope App. B, section 2.4, Table 2 (obtained from web site) • Co-location: contract scope section 3.0 (obtained from web site)
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Innovation matrix • Open book estimating: contract scope, App. B, section 4.0 • Definitions of categorization and accounting, such as direct and indirect costs: contract scope, App. B, section 4.4 (obtained from web site) • Interim pricing milestone and bid validation • Cost-comparison spreadsheet • ICE
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 5. South Fork Smith River Road Bridge (CM-GC), California

Project Name: South Fork Smith River Road Bridge (George E. Tyron Bridge)

Name of Agency: Central Federal Lands Highway Division of FHWA in collaboration with Six Rivers National Forest, Del Norte County, FHWA California Division, Caltrans, California State Parks

Location: On County Road 427, Forest Highway 112 (also known as South Fork Smith River Road) near Hiouchi in northwestern California

Project Delivery Method–Procurement–Contract Type: CM-GC–Best Value–Guaranteed Maximum Price

Total Project Cost: \$15.3 million (\$11.45 million construction)

Construction Schedule: August 2013–March 2017

Project Description: This project replaced the historic steel arch bridge (1948) over the South Fork Smith River, part of the National Wild and Scenic Rivers System and home to several threatened, endangered, and sensitive species. The new two-lane bridge has a concrete arch that spans 141 feet (Figure B5.1). Additional improvements included paving, drainage, and demolition of the existing bridge. The new bridge was built around the existing bridge, which allowed traffic to be maintained throughout the construction process. The bridge was designed by Central Federal Lands Highway Division and built by Flatiron. A summary of the initial tools for the investigation is shown in Table B5.1.



Figure B5.1. George E. Tyron Bridge (Source: Central Federal Lands Highway Division).

Table B5.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • ACM role and responsibilities (matrix) • List of steps in submittal review process that indicate CM-GC's role. • Partnering meeting
2. Administer CM-GC Design	<ul style="list-style-type: none"> • None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Cost-comparison spreadsheet • Negotiate profit and overhead for construction in preconstruction services contract
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 6. SR-108; SR-127 to SR-107 (CM-GC), Utah

Project Name: SR-108; SR-127 to SR-107 (2000 West: Syracuse to West Point)

Name of Agency: Utah Department of Transportation (Utah DOT)

Location: Syracuse City and West Point City, Utah

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualifications-Based Selection–Unit Price

Construction Cost: \$50 million

Construction Schedule: March 2017–November 2018

Project Description: This project will reconstruct and widen 2 miles of concrete pavement from three lanes to five lanes (Figure B6.1). Project challenges will include coordinating work with access to three schools along the corridor, extensive right-of-way acquisition, and utility relocations and upgrades. The contractor will be Granite Construction, and the designer will be Horrocks Engineers. A summary of the initial tools for the investigation is shown in Table B6.1.



Figure B6.1. SR-108 widening (Source: Utah Department of Transportation).

Table B6.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • Road Map goals card • RFP-CM-GC roles and responsibilities • RFP—continuity of staff through life of project • CM-GC general guidelines • Kickoff meeting agenda • Project Dashboard: website with vision, mission, goals, emphasis, and values • Agreement with FHWA regarding FHWA involvement in UDOT CM-GC projects
2. Administer CM-GC Design	<ul style="list-style-type: none"> • Plan sheet with early work package item clouded
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • SR-108 Fair Pricing Strategy • Innovation matrix • Communicate regularly with CM-GC about their preconstruction role • Spreadsheet to compare blind bids
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • List of lessons learned

Case Study 7. Winona Bridge (CM-GC), Minnesota

Project Name: Winona Bridge

Name of Agency: Minnesota Department of Transportation (Minnesota DOT)

Location: Highway 43 Bridge over Mississippi River in Winona

Project Delivery Method—Procurement—Contract Type: CM-GC—Best Value—Unit Price

Total Project Cost: \$147 million

Construction Schedule: August 2014—December 2019. New bridge opened August 2016

Project Description: This project will rehabilitate the existing steel truss bridge over the Mississippi River in Winona. The existing bridge structure, which is on the national register of historic places, is a 2,281 ft. structure, which includes a 933 ft., three-span, continuous-steel, riveted high truss (Figure B7.1). There are also 21 approach spans consisting of 3 spans of steel girders, 12 spans of concrete girders, two spans of steel, riveted deck truss on the south end, and four spans of steel, riveted deck truss on the north end. The new 50 ft., 4-inch-wide concrete box girder bridge will carry two lanes of traffic with shoulders and a separated 12-feet pedestrian and bike lane. Roadway approaches for both bridge structures will be constructed. A summary of the initial tools for the investigation is shown in Table B7.1.



**Figure B7.1. Winona Bridge construction
(Source: Minnesota Department of Transportation).**

Table B7.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities • Interim Pricing Milestone and bid evaluation • Minnesota DOT PM and Contractor meet with Minnesota DOT functional teams individually to explain the CM-GC process, rolls, and expectations
2. Administer CM-GC Design	<ul style="list-style-type: none"> • CM-GC can recommend changes to the requirements and standards
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Designer produced management plans with contractor input prior to construction contract letting, including Integrated Shop Drawing Plan for the Concrete Segmental Bridge, Environment. Management Plan, Safety Plan, etc. • ICE • Cost-comparison spreadsheet (For cost estimating, compare raw unit prices (material, labor, equipment). Later add or spread in indirect costs and markup. This allows for clear comparison.) • Innovation matrix • Negotiate CM-GC rates and markup before the first CM-GC precon invoice • Over-the-shoulder reviews • Interim pricing milestones and bid validation (ability to negotiate once after the contractor submits a bid on a work package) • Coordinate work packages (items needed throughout the project may appear in one package, instead of each package)
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • Witness and hold points identified in QMP, and the QMP was closely adhered to • Management-level support for CM-GC process • Continuity of team members • ACM public announcement
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 8. SH 82 Grand Avenue Bridge (CM-GC), Colorado

Project Name: Grand Avenue Bridge

Name of Agency: Colorado Department of Transportation, with support from the Colorado Bridge Enterprise, utility companies, Glenwood Springs, Garfield County, and Eagle County

Location: Highway 82 over the Colorado River in Glenwood Springs

Project Delivery Method–Procurement–Contract Type: CM-GC–Qualification-Based Selection–Unit Price

Total Project Cost: \$125.6 million (\$68.4 million construction and \$7.5 million in long lead-time procurement items)

Construction Schedule: January 2016–June 2018

Project Description: The existing traffic bridge (1953) and pedestrian bridge (1985) were each replaced (Figure B8.1). The bridges crossed over 7th Street, Union Pacific Railroad tracks, the Colorado River, I-70, North River Street, and the Glenwood Hot Springs parking lot. The project was planned with five phases. In phase four, bridge access to vehicles was closed and traffic detoured. The CM-GC was Granite–RL Wadsworth Joint Venture. Jacobs Engineering was the prime design consultant. The traffic bridge designer was Tsionavaras Simmons Holderness (TSH). The pedestrian bridge designer was AMEC Foster Wheeler. A summary of the initial tools for the investigation is shown in Table B8.1.



Figure B8.1. Grand Avenue Bridge construction
(Source: Colorado Department of Transportation).

Table B8.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • Partnering kickoff meeting • ACM roles and responsibilities • ACM training (talk to other DOTs to learn from their experience; RE meets with other DOT staff to share and learn)
2. Administer CM-GC Design	<ul style="list-style-type: none"> • Independent party design review
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Cost-comparison spreadsheet • ICE • Interim pricing milestone and bid validation • Cost approach (list of cost model assumptions) • Risk pools • Colorado DOT CM-GC Manual
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • Continuity of team members • ACM public announcement (newspaper article about bridge closure that included the value of CM-GC delivery)
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 9. Trunk Highway (TH) 53 Relocation Project (CM-GC), Minnesota

Project Name: Hwy 53 Relocation

Name of Agency: Minnesota Department of Transportation

Location: TH 53 from Bourgin Road to Second Avenue between Virginia and Eveleth, Minnesota

Project Delivery Method—Procurement—Contract Type: CM-GC—Best Value—Unit Price

Total Project Cost: \$240 million (\$156 million construction)

Construction Schedule: November 2015–November 2017

Project Description: This road and bridge project covered 3.2 miles (Figure B9.1). The existing bridge was relocated to accommodate mining for United Taconite. The new 1,100 ft. bridge spans the Rouchleau Iron Ore Mine Pit. Steel girders were used on the three-span bridge approximately 250 ft. high. The foundation uses 30 in. micropiles. A new interchange was constructed at Highway 135, and the interchange at Second Avenue is being reconstructed. The work included the relocation of City of Virginia utilities. Parsons was the bridge designer, Kiewit was the CM-GC, and Veit Specialty Contracting was the foundation contractor. A summary of the initial tools for the investigation is shown in Table B9.1.



Figure B9.1. Hwy 53 Bridge construction
(Source: Minnesota Department of Transportation).

Table B9.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • Minnesota DOT CM-GC Manual—Draft • Glossary of ACM terms (definitions of CM-GC terms in Manual) • Overview of FHWA involvement on ACM Projects • ACM roles and responsibilities (Section 3.1) • ACM training (from Innovative Contracting Office: PowerPoint slides and agenda; learn from experienced agency staff) • Partnering • Kickoff meeting • Monthly Subcabinet meetings for State Departments • Discipline task force (weekly Minnesota DOT Functional Group meetings) • Co-location
2. Administer CM-GC Design	<ul style="list-style-type: none"> • None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • Risk pools (Risk Register Level 1 and 2: allocate risk and identify \$ amount) • Interim pricing milestone and bid validation (Exhibit 5.5-1 Sample Interim Pricing Milestone Schedule) and Figure 1: CM-GC Bid Validation Process (rev. April 2015) and Fig. 6.1-1 CM-GC Price Proposal Validation Process • Cost-comparison spreadsheet (Exhibit 5.5-2 Sample Variance Report) • ICE • Innovation matrix: Cost and schedule savings (Form 5.4-1 Cost and Schedule—Savings Matrix Template) and (Form 5.4-2 Cost and Schedule Savings Summary Log Template)
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • None
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 10. Ina Road Traffic Interchange Project (CM-GC), Arizona

Project Name: Ina Road Traffic Interchange

Name of Agency: Arizona Department of Transportation

Location: Ina Road and I-10, Tucson, Arizona

Project Delivery Method—Procurement—Contract Type: CM-GC—Qualifications-Based Selection—Guaranteed Maximum Price

Construction Cost: \$124 million

Construction Schedule: July 2016–June 2019

Project Description: This project will widen I-10 to six lanes for 1.5 miles and widen Ina Road to four lanes from Silverbell Road to Camino De La Cruz. The existing grade crossing of Ina Road at the Union Pacific Railroad will be replaced with a bridge over the railroad and I-10, approximately 25 ft. high. Improvements will also include two new bridges for Ina Road over the Santa Cruz River (Figure B10.1). The I-10 frontage road will be raised to meet the new Ina Road overpass. Additional improvements will include concrete box culverts, retaining walls, water and sewer relocations, and traffic signals. Psomas will be the designer, and Sundt–Kiewit will be the CM-GC. A summary of the initial tools for the investigation is shown in Table B10.1.



Figure B10.1. Ina Road–Santa Cruz Bridge
(Source: Arizona Department of Transportation).

Table B10.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> Arizona DOT CMAR Process Guide, Sept. 2014 (obtained) Established core team and lines of communication Partnering
2. Administer CM-GC Design	<ul style="list-style-type: none"> None
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> ICE Cost-comparison spreadsheet Value Engineering spreadsheet Interim pricing milestone and bid validation
4. Administer CM-GC Construction	<ul style="list-style-type: none"> Risk pools
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> None

Case Study 11. E-470 (CM-GC), Colorado

Project Name: E-470 Road Widening Project

Name of Agency: Colorado Public Highway Authority

Location: Adams, Arapahoe, and Douglas Counties, Colorado

Project Delivery Method–Procurement–Contract Type: CM-GC–Best Value–Unit Price

Total Project Cost: \$90 million

Construction Schedule: Spring 2016–December 2017

Project Description: This section of E-470 was constructed in 1997–1998 and consists of two lanes in each direction plus a climbing lane in one section. A traffic and revenue study predicted that the highway in this area would experience level-of-service D congestion between 2018 and 2021. This project added a third lane in both directions for the 8-mile section of the highway between Parker Road and Quincy Avenue (Figure B11.1). Eleven bridges will all be widened to the ultimate 6-lane configuration. There were no toll infrastructure improvements in this project, and the existing pavement was overlaid. A multipurpose pedestrian–bike trail was also constructed adjacent to the road as part of this project. A summary of the initial tools for the investigation is shown in Table B11.1.



Figure B11.1. E-470 Widening (Source: Colorado Department of Transportation).

Table B11.1. Summary of initial tools for investigation.

Agency Activities	Initial
1. Administer Alignment between CM-GC, Designer, and DOT	<ul style="list-style-type: none"> • Kickoff meeting • Pre-proposal meeting • Field views (one-on-one meetings to view project location)
2. Administer CM-GC Design	<ul style="list-style-type: none"> • Value Engineering Matrix • Continuity of team members required in RFP
3. Administer CM-GC Preconstruction Services	<ul style="list-style-type: none"> • ICE • Cost comparison spreadsheet • Reconciliation meetings when differences between ICE and CM-GC were discovered • Open book estimating (subs bids were shown to PHA)
4. Administer CM-GC Construction	<ul style="list-style-type: none"> • Hold points used, but not required • One public meeting held in preconstruction phase
5. Administer CM-GC Closeout	<ul style="list-style-type: none"> • None

Case Study 12. Braddock Road–Pleasant Valley Roundabout (D-B), Virginia

Project Name: Braddock Road (Route 620) and Pleasant Valley Road (Route 609) Intersection Improvement

Name of Agency: Virginia Department of Transportation

Location: Fairfax Country, Virginia

Project Delivery Method–Procurement–Contract Type: D-B–Low Bid–Lump Sum

Total Project Cost: \$5.9 million

Construction Schedule: April 2015–May 2016

Project Description: This project involved the design and construction of improvements to Braddock Road (Route 620) and Pleasant Valley Road (Route 609) and the installation of a roundabout at the intersection (Figure B12.1). The project included, among other things, (a) the design and construction of a roundabout, (b) widening and improvements on existing roads, (c) milling and overlay, (d) demolition of pavement, (e) right of way acquisition, (f) drainage, (g) storm water management, (h) erosion and sediment control, (i) utility relocations, (j) lighting, and (k) signing and pavement marking within project limits. A summary of the initial tools for the investigation is shown in Table B12.1.

Clause Code:	011-DSRA-01
Clause Type:	Design Submittal, Review & Approval
Project Name:	US 2 Rice Road Intersection Safety Improvement
Owner Name:	Washington DOT
Year Published:	2011

2.28.3.2 WSDOT DESIGN REVIEW

The QMP shall define the timing, content, and format of all design reviews. The Design-Builder shall provide a 14 Calendar Day review period for WSDOT Review and Comment on all design submittals. WSDOT reserves the right to extend the review time by up to seven Calendar Days for submittals that are received between November 15th and January 1st, and for submittals with overlapping review periods which are being reviewed by the same discipline team.

The Design-Builder shall address all comments made by WSDOT in each submittal, and shall include comment resolutions in subsequent submittals.

The Design-Builder shall schedule and maintain minutes of all resolution meetings with the appropriate WSDOT staff to document and resolve the Design-Builder's responses to the comments. It is intended that all comments will be resolved at these meetings. If agreement is not reached on any specific comment, it shall be resolved as described in the QMP.

2.28.3.3 DESIGN TASK FORCES AND OVER-THE-SHOULDER REVIEWS

The QMP shall also include processes and procedures for how regular (weekly) scheduled coordination meetings between WSDOT and the Design-Builder will be used to support quality goals. These meetings, combined with over-the-shoulder reviews, shall be an integral part of the process to discuss and resolve design issues outside of the formal review process. The QMP shall define how over-the-shoulder reviews with WSDOT during the course of the development of each design package will be included. The over-the-shoulder reviews are not Hold Points that restrict the progress of design. They are reviews of the design as it progresses, and opportunities for WSDOT to provide comments and feedback on the design.

2.28.3.4 RELEASED FOR CONSTRUCTION (RFC) DOCUMENT REVIEW

At a minimum, the Design-Builder shall provide a preliminary and a final submittal of all plans, Technical Specifications, shop drawings, and resolve all comments prior to being Released for Construction. Special Provisions taken from Appendix B2 shall not be included by reference, but shall have their full text included in the final design submittal and Released for Construction documents. Special Provisions from Appendix B2 that are not part of the Work shall not be included in the Released for Construction documents. Any deviation from the Mandatory Standards and Technical Requirements shall be approved by WSDOT prior to a submittal being Released for Construction.

<Omitted>

2.28.3.4.2 Preliminary Design Submittal

The intent of the Preliminary Design Submittal is to provide a formal opportunity for WSDOT, the Design-Builder, various design team disciplines, and other approved Project stakeholders to review the construction documents in order to ensure that the design is progressing appropriately and proceeding in the right direction; the plans reflect Design-Builder requirements for construction; design features are coordinated; and there are no

conform with the design criteria and generally accepted design and engineering practice; the construction of work that conforms to the contract requirements; the identification of root causes of problems, the timely implementation of planned changes to design and work processes to prevent repeated deficiencies; the reliable identification and documentation of defective design and construction work; and the consistent tracking of defective work through correction.

Performance of the work may be stopped in accordance with Subsection 108.05, either in whole or in part, for failure to comply with the requirements of the Section. The Government may charge to the Contractor the cost of any additional inspections required when the work being inspected is found not to comply with contract requirements during the initial inspection. Work stop orders, due to recurring deficiencies of work required by this Section, will be rescinded after the Contractor demonstrates to the CO that changes were made to the quality control plan and system which resulted in the correction of those deficiencies. There will be no adjustment in the contract time, or payments to the Contractor for any impacts, delays or other costs due to any periods of work stoppage resulting from failure to comply with the requirements of this Section.

<Omitted>

Refer also to:

Section 154. — CONTRACTOR SAMPLING AND TESTING

laboratory for inspection and review.

(c) Certifications. For materials or work accepted by certification in accordance with 106.03, review all certifications to [ensure] compliance with the requirements of the contract prior to incorporating materials into the work and provide a signed copy of the reviewed certification(s) to the CO. According to FAR Subpart 46.407, materials or work without proper certification will be rejected in writing, and payment for such material or work will be withheld until proper certification has been provided to the CO.

153.09 Records. Maintain daily records documenting Quality Assurance and Quality Control activities taken to ensure the construction of quality end products and work that conforms to the contract requirements and make them accessible to the CO. Maintain complete testing and inspection records by type of work or pay item number and make them accessible to the CO.

For each day of work, prepare an "*Inspector's Daily Record of Construction Operations*" (Form FHWA 1413) or an approved alternate form. Report inspection results in detail, including deficiencies observed and corrective actions taken. Identify locations of work and labor and equipment used, including actual hours worked, to perform each item of work. When submitting test results on material being incorporated into the work, report test results within the reporting times indicated in the sampling and testing requirements at the end of each section or as specified in the contract. Include the following certification signed by the QCS with overall responsibility for the inspection system:

"It is hereby certified that the information contained in this record is accurate and that all work documented herein complies with the requirements of the contract. Any exceptions to this certification are documented as a part of this record."

Submit the record and certification within 24 hours of the work being performed. If the record is incomplete, in error, or otherwise misleading, a copy of the record will be returned with corrections noted. When chronic errors or omissions occur, correct the procedures by which the records are produced.

Maintain linear control charts that identify the project number, pay item number, test number, each test parameter, the upper and lower specification limit applicable to each test parameter, and the test results. Use the control charts as part of the quality control system to document the variability of the process, to identify production and equipment problems, and to identify actions to improve processes or quality.

Post control charts in an accessible location and keep them up-to-date. Cease production and make corrections to the process when problems are evident.

153.10 Acceptance. The administration of the Contractor's Quality Management Plan will be evaluated under Subsection 106.02 based on the demonstrated effectiveness of the QA and QC system to result in the use of systematic, consistent, and effective work processes; accurate, adequate, and timely documentation of QA/QC activities; the design of works that

The CO may require a demonstration of proficiency in sampling and testing capabilities. One or more proficiency samples may be provided by the Government to verify basic qualifications. Provide the results of the proficiency samples to the CO within 48 hours of receipt of the material.

(e) Subcontractors and suppliers. Include the work of all subcontractors. If a subcontractor is to perform work under this Section, explain how the subcontractor's inspection plan will interface with the Prime Contractor first tier subcontractors and lower tier subcontractors and organizations, and the CO. Include the work of major suppliers and suppliers of structural and geotechnical services and materials.

Modifications or additions may be required to any part of the plan that is not adequately covered. Acceptance of the quality control plan will be based on the inclusion of the required information. Acceptance does not imply any warranty by the Government that the plan will result in consistent contract compliance. It remains the responsibility of the Contractor to demonstrate such compliance.

Supplement the plan for changes in the contract as work progresses and whenever quality control or quality control personnel changes are made.

153.08 Sampling and Testing. Perform sampling and testing as required by Table 153-1, Acceptance Sampling and Testing tables located at the end of each applicable Section, and by the accepted QMP.

(a) Sample Splitting. Split samples of all acceptance samples will be provided to the Government for verification testing as specified in Section 154. Schedules and times or locations for obtaining on-site split samples for verification testing performed by the Government will be provided by the CO using a procedure for random sampling.

(b) Testing. Furnish a laboratory equipped with all test equipment necessary to satisfy the requirements of the contract. Ensure test equipment has been checked, calibrated, standardized and/or otherwise verified in accordance with AASHTO and ASTM standards by an individual qualified to do this work. Ensure mobile laboratories receive an equipment inspection after the laboratory has been moved to its permanent location on the project site and anytime it is moved thereafter. Inspect equipment within 45 days of actual use in project testing and at least once a year thereafter. Do not use equipment that has not been inspected or is found to be deficient. Mark deficient equipment and take it out-of-service until it is repaired or replaced and shown by subsequent inspection to perform as required. Maintain records documenting these inspections in the laboratory. Provide certification(s) stating the equipment conforms to testing requirements and provide evidence of current inspection. The CO may require the Contractor to perform testing to demonstrate acceptable equipment and an acceptable level of technician competence.

The CO may also check equipment and inspection records to verify condition. Repair or replace equipment not meeting applicable requirements. Keep laboratory facilities clean and maintain equipment in proper working condition. Provide the CO unrestricted access to the

construction Quality Control Supervisor (QCS), with the overall responsibility for managing the inspection and testing requirements of this section. Document in the QMP the names, authority, and relevant experience of all personnel directly responsible for inspection and testing.

(1) Quality Control Supervisor. The QCS is responsible for supervising quality control personnel; monitoring inspection, sampling, and testing for all phases of the work; identifying deficiencies; and taking appropriate corrective action. Designate a full-time, onsite QCS who will be immediately available during all phases of the work and has the authority to act for the Contractor on quality-related matters. The QCS may not perform primary testing and inspection except when approved in writing by the CO for infrequent and limited activities and as long as all of the work on the project is well-managed, in control, and is receiving the level of testing and inspection required by the contract. Designate a QCS who possesses one of the following credentials:

- (a) 2 years direct experience supervising or managing highway construction quality control or quality assurance programs for state or federal projects, or
- (b) 3 years of experience as: (a) a construction project manager on highway construction projects, or (b) a construction superintendent on highway construction projects, or (c) a federal or state highway construction project engineer, resident engineer, or equivalent, or
- (c) NICET Level III certification in highway construction or highway materials or equivalent, or
- (d) A degree from a 4-year construction management, construction engineering, or similar program, and having at least 3 years' experience as (a) a highway construction contractor foreman, project engineer, or equivalent, or (b) a federal or state highway construction lead inspector or equivalent.

(2) Inspectors. Furnish inspectors having training commensurate with the scope, complexity, and type of work being inspected, and having at least 2 years of experience inspecting the type of work being inspected and performing the types of inspections to be performed.

(3) Testers. Furnish testers having 1 year or more of recent job experience in the type of sampling and testing required by the contract, and one of the following:

- (a) NICET Level II certification in highway materials, or State (SHA) or industry certification-related sampling and testing equivalent to the sampling and testing to be performed for this contract,
- (b) WAQTC or other nationally accepted certification program for intended sampling and testing responsibilities,
- (c) At least 1 year of current or previous employment by an AASHTO accredited laboratory performing sampling and testing equivalent to the sampling and testing to be performed for this contract.

requirements. Provide training as necessary.

(e) Ensure preliminary testing and inspection is accomplished.

(f) Coordinate surveying and staking of the work.

(2) Start-up phase.

(a) In a start-up phase meeting, review the contract requirements and the processes for constructing the work with the personnel who will be performing the work. Invite the CO, project superintendent, QCS, testers, and inspectors of the work being performed, and the personnel directly supervising and performing the work. Review the planned testing, inspection, and reporting requirements with the quality control personnel responsible for the testing and inspection. Explain the reporting procedures to be used when defective work is identified. Conduct a start-up meeting for each type of work to be performed upon beginning the work.

(b) Inspect and test start-up of work at a frequency sufficient to establish confidence in the work process.

(c) Establish a detailed testing schedule based on the production schedule.

(3) Production phase.

(a) Conduct intermittent or continuous inspection during construction to identify and correct deficiencies.

(b) Conduct inspections to ensure that planned construction processes are consistently followed and the processes are effective in producing work that complies with the contract requirements.

(c) Inspect, test, and report completed work before requesting Government inspection. Compare the work to the contract requirements and evaluate acceptability of the work produced.

(d) Inspect the work, materials or assemblies accepted under Subsection 106.03 to ensure that all the work and materials comply with contract requirements. Furnish the results of inspections, along with product or commercial certification as applicable, to the CO prior to incorporating the materials into the work.

(e) Sample and test aggregates and/or aggregate/asphalt mixtures accepted under Subsection 106.03, for conformity with the product certification a minimum of one time per pay item.

(f) Provide feedback on processes and deficiencies, identify root causes of deficiencies, and make timely and effective changes to work processes to prevent repeated deficiencies.

(c) Description of records. List the records to be maintained. Identify the format for reporting results, materials certifications and the procedures to be used to maintain inspection records.

(d) Personnel qualifications. Furnish competent and effective quality assurance and quality control personnel to perform the activities required by the QMP and this Section. Document the QMP the name, authority, relevant experience, and qualifications of the

153.07. Contractor Quality Control Plan. At least 14 days before the start of on-site work, submit a written quality control plan (QCP) for acceptance. Do not perform any on-site work without an approved quality control plan. The QMP shall include the Construction QA and QC procedures utilized to ensure the quality of constructed end products in accordance with the contract requirements.

The plan shall include the following:

(a) Process control testing. List the material to be tested by pay item or Section of FP-03, tests to be conducted, the location of sampling, the frequency of testing, the person(s) responsible for performing the sampling and testing, laboratory testing facilities to be used for process control and project testing, and the proposed reporting formats. Furnish the names, to the CO, of personnel who will be responsible for on-site inspection and testing duties, provide a description of the work that each tester and inspector will be assigned, and experience with the work assigned. At a minimum, perform process control testing in accordance with Table 153-1, schedule of minimum sampling and testing procedures for process control. Where no minimums are specified, submit proposed tests to be performed and the proposed sampling and testing frequencies.

(b) Quality acceptance sampling and testing. Acceptance sampling and testing will be performed as specified in Section 154. Contractor Acceptance Sampling and Testing. Sample and test material according to the Sampling and Testing Requirements at the end of each section. List the material to be tested by pay item or section of the FP-03, the person(s) responsible for performing the sampling and testing, laboratory testing facilities to be used for acceptance testing, and the proposed reporting formats. Furnish the names, to the CO, of personnel who will be responsible for the sampling and testing duties.

(c) Quality assurance sampling and testing. List procedures and methods to be used to provide quality assurance for all sampling and testing performed during the project. List the person responsible for quality assurance and the methods used to document the sampling and testing activities and procedures for handling and documenting nonconforming work.

(d) Inspection/control procedures. As part of the QMP develop three phase inspection and control plans for each type of work. The three phase inspection and control plans shall develop inspection and control procedures for each phase of construction. Address each of the subjects shown for each phase of construction.

(1) Preparatory phase.

(a) In a preparatory phase meeting, review the contract requirements for the work; the process for constructing the work; and the plan for inspecting, testing, measuring, and reporting the work. Include the project superintendent, the quality control supervisor (QCS), the foreman for the work to be performed, and the CO in the meeting.

Schedule and conduct a preparatory meeting for each type of work to be performed at least one week prior to beginning the work.

(b) Ensure compliance of component material to the contract requirements.

(c) Coordinate all submittals including certifications.

(d) Ensure capability of equipment and personnel to comply with the contract

(h) The requirements for documentation; for the filing of design criteria, reports and notes, calculations, drawings, schematics, supporting materials, etc.; and for the specific responsibilities of personnel to satisfy these requirements. All such documents shall be maintained by the Contractor for the duration of the Contract and shall be organized, indexed and delivered to the Government (1) upon Final Acceptance unless required to be delivered earlier pursuant to the Contract Documents, or (2) even if incomplete, within seven days of receipt of request from the Government.

153.04 Periodic Review of Design Work. Submissions of drawings, specifications and computations as specified in the Subsection 121 Design Submittals and Reviews shall be accompanied by documentation confirming that the Contractor has fully applied and carried out the approved Design Control Plan. This documentation shall include all appropriate Design Documents and Construction Documents, including design criteria, reports, drawings, schematics, calculations, tables, plan sheets, etc., including columns for checking, revising, back checking and other quality control reviews. Documentation of conformance to the design Quality Control Plan is a requisite element of each submittal and design review. Any submittal not accompanied by sufficient verification of the application of quality assurance and control procedures will be returned to the Contractor. The Contractor shall provide with each design review submittal a written certification that the submittal complies with the Design Quality Control Plan in all respects, unless exempted by prior written authorization by the Government.

153.05 Design Quality Review. Prior to the submittal of final Design Documents and Construction Documents to the Government, the Contractor shall complete quality control review with architects and engineers experienced in the appropriate disciplines(s). The review shall verify that the Design Documents and Construction Documents were prepared in such a manner as to ensure that they will be acceptable to the Government, as well as the Contractor. The criteria used in such review shall include (1) conformity of the final Design documents and Construction Documents with the Contract Documents; (2) assurance that all materials, equipment and elements of the Work provided for in such documents which shall be incorporated into the Project have been provided for and designed to perform satisfactorily for the purpose intended; (3) the appearance, organization, technical and grammatical accuracy of such documents; (4) verification that such documents have been checked and signed by the drafter, designer, checker and reviewers; (5) where required under the Contract, generally accepted architectural or engineering practices or applicable law, verification that such documents have been stamped, signed and dated by the responsible registered engineer or architect; and (6) assurance that such documents fully provide for constructability, compatibility of materials and conformity to acceptance criteria for inspections and tests as provided in the Contract.

153.06 Design Changes. Changes, including field changes, in the design of the project or any portion thereof as shown on the Project Design Documents, shall be subject to design quality control measures and procedures commensurate with those applied to the original design of the portion of the Project being changed.

Construction Requirements

(a) The quality control procedures for each type of Design Document and Construction Document shall be organized by engineering discipline (such as structural, geotechnical, hydraulics and civil). These procedures shall specify measures to be taken by the Contractor (1) to ensure that appropriate quality standards are specified and included in the Design Documents and Construction Documents and to control deviations from such standards, it being understood and agreed that no deviations from such standards shall be made unless they have been previously approved by the Government at the Government's sole discretion, and (2) for the selection of suitable materials and elements of the Work that are included in the Project.

(b) Quality control procedures for preparing and checking all plans, calculations, drawings and other design items submitted, to ensure that they are independently checked and back-checked in accordance with generally accepted architectural and engineering practices, by experienced licensed architects and engineers, respectively. The originator, checker and back-checker shall be clearly identified on the face of all submittals. Specific procedures for verifying computer programs used shall also be included. Plans, reports and other documents shall be stamped, signed and dated by the responsible registered architect or engineer where required under the Contract Documents, under generally accepted architectural or engineering practices or by applicable law.

(c) The level, frequency, and methods of review of the adequacy of the design of the Project, including the methods by which all final Design Documents and Construction Documents shall be independently reviewed, verified for adequacy of design, and back-checked in accordance with generally accepted design and engineering practice by experienced, internal architects and engineers not involved with the preparation of such Documents.

(d) Procedures for coordinating Work performed by different persons in the same area, or in adjacent areas, or in related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings, or between the drawings and the specifications, and to coordinate the review, approval, release, distribution, and revision of documents involving such persons.

(e) Those elements of the Contract Documents, Design Documents or Construction Documents, if any, requiring special quality control attention or emphasis, including applicable standards of quality or practice to be met, level of completeness and/or extent of detailing required.

(f) By discipline, the name, qualifications, duties, responsibilities and authorities for all persons proposed to be responsible for Design Quality Control.

(g) The resources required for the design quality assurance and control functions, including proposed specific timing, manpower and resources requirements, including scheduled activities for design quality control identifying the Design Documents and Construction Documents to be delivered to the Government for its review at each stage of the design of the Project.

153.01 This work consists of providing quality control (QC) for the design and construction elements of the project. This work includes the development and management of the Quality Management Plan for both design and construction. Work also includes obtaining samples and performing tests for Contractor quality control testing, providing design reviews, providing inspection, and exercising management control during both the design and construction phases to ensure the construction of quality end products and work that conforms to the contract requirements. This work supplements FAR Clause 52.246-12.

153.02 Quality Management Plan. Before the start of any design or construction work, submit a written quality management plan (QMP) for acceptance. The QMP shall include the following along with the Design and Construction Requirements detailed in this section.

- Description of overall QC program that addresses the relationship between the design and construction teams to build quality into the activities and products for the Project.
- Method for delivering high-quality design products, including QC activities. Describe coordination procedures between design activities, the construction team and CO to proactively address site conditions, materials, and construction methods.
- Method for delivering high quality constructed products, including QC activities. Include processes and procedures for materials sampling and testing. Describe coordination procedures between the construction team, designers and CO during construction activities.
- Detail the QC organizations. Identify the Project QC Manager, Design QC Manager and the Construction QC Manager. Include the expected minimum number of employees with specific QC responsibilities. Provide an organizational chart showing lines of authority and reporting responsibilities, and the interaction between design and construction. Define the organizational relationship between the QC organizations, and the design and construction organizations.
- Description of all QC activities that will be undertaken during design and construction.
- Management of submittals.
- Methods for document control. Describe procedures to manage the delivery and distribution of all documents for both design and construction.
- Method for documenting conformance with the QMP. Detail of QC activities undertaken during design and construction. Method for documenting changes.
- Description of process used to identify, document and correct non-conforming work.
- Incorporate all requirements of Section 154. Contractor Acceptance Sampling and Testing into the QMP.
- Incorporate all comments received during the RFP phase of the contract.

Design Requirements

153.03 General. The QMP shall include the Design QC procedures utilized to ensure that all Design Documents and construction Documents are prepared in accordance with good, prudent, and generally accepted design and engineering practice.

The plan shall include the following:

Clause Code:	010-QM-03
Clause Type:	Quality Management (Quality Control)
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

II. EVALUATION CRITERIA/PROPOSAL REQUIREMENTS

EVALUATION CRITERIA

The criteria listed below are in order of descending importance for technical scoring by the Evaluation Board.

<Omitted>

1. Quality Management Plan

The proposers shall submit information regarding their overall plan to manage quality throughout the delivery of the Project. The submittal shall include a written Quality Management Plan that describes the Quality Control, Quality Assurance and Independent Assurance activities that will be utilized during design and construction. Include the following:

A. Quality Management Plan Summary:

- o Integration of Quality Management into the overall project team, including organizational relationships between the Contractor's QA/QC Manager, Design QA/QC Manager and Construction QA/QC Manager, and;
- o Procedures for including quality assurance and quality control activities into the design and construction processes.

B. Quality Management Plan that describes the Quality Assurance and Quality Control activities that will be undertaken during design and construction shall be a written document included as an appendix to the Proposal (not included in the page count):

- o Description of overall QA/QC program that addresses the relationship between the design and construction teams to build quality into the activities and products for the Project;
- o Method for delivering high-quality design products, including Quality Assurance and Quality Control activities. Describe coordination procedures between design activities and the construction team to proactively address site conditions, materials, and construction methods;
- o Method for delivering high-quality constructed products, including Quality Assurance and Quality Control activities. Include processes and procedures for materials sampling and testing. Describe coordination and interface procedures between the construction team and the designers during design and construction activities.

<Omitted>

Section 153. — CONTRACTOR QUALITY CONTROL

Delete this section and add the following:

Description

performing Quality Control Testing, as well as taking split samples for the purposes of comparison testing. Independent Assurance Testing will be at an approximate frequency of one-tenth of the Acceptance Testing frequency. Independent Assurance test results will not be used for acceptance. The cost of these activities will be borne by SCDOT.

3. Materials Certification: SCDOT will be responsible for preparing the Materials Certification as required by the FHWA on federally funded projects.

C. CONTRACTOR's Obligation

SCDOT's testing in no way relieves CONTRACTOR of its obligation to comply with the Contract requirements. All materials incorporated into the Project must meet or exceed contract requirements and specifications. Further, any testing by SCDOT will not relieve CONTRACTOR of any of its warranty obligations.

4. Testing Laboratories: All testing laboratories used on the Project must be AASHTO certified and approved by SCDOT thirty (30) days prior to beginning the portion of work for which the laboratory will be performing the testing.
5. Mix Designs: Copies of all initial hot-mix asphalt mix designs and Portland Cement Concrete mix designs, along with supporting data, shall be submitted to SCDOT for review at least seven (7) days prior to use. All hot-mix asphalt mix designs will be prepared by personnel certified in Mix Design Methods. Portland Cement Concrete mix designs will be prepared by a certified concrete technician or a Professional Engineer. The Portland Cement Concrete mix proportions given in the specifications are to be followed. CONTRACTOR shall design the mix to obtain the strength and water/cement ratios given in the specifications, and shall provide workability, air content, gradation and suitable set times as set forth in the Standard Specifications. The SCDOT will be notified of any revisions to CONTRACTOR's mix design. Copies of such revisions will be sent to SCDOT for review at least fourteen (14) days prior to use.
6. Materials Certifications: CONTRACTOR shall submit all material certifications for approval by SCDOT prior to the CONTRACTOR incorporating the material and applying for payment for work in which the material was incorporated. Upon Completion of the project, CONTRACTOR shall submit to SCDOT a letter of certification stating that, based upon an analysis of all materials test results, all materials incorporated into the Project were found to be in substantial conformance with the requirements of the plans and specifications. A list of any exceptions and all failing test results will be provided, along with a record of disposition of the material represented by these tests.

B. SCDOT Responsibilities SCDOT will be responsible for the QUALITY ACCEPTANCE portion of the program to include: conducting inspections, acceptance testing, independent assurance testing and final project material certification.

1. Acceptance Testing: SCDOT personnel assigned to the Project, or qualified personnel retained by SCDOT, will conduct sampling and testing, separate from CONTRACTOR's testing, at the frequencies set forth in SCDOT's construction manual. This testing will be used by SCDOT to determine the acceptability of the materials. All sampling and testing will be in accordance with existing AASHTO, ASTM, or SC test methods used by SCDOT. The cost of these activities will be borne by SCDOT. CONTRACTOR is required to coordinate its activities closely with SCDOT to allow the necessary acceptance testing to be conducted prior to proceeding to the next operation. The disposition of failing materials must be approved by SCDOT.
2. Independent Assurance Testing: SCDOT will be responsible for conducting Independent Assurance Testing. Personnel performing these tests will be SCDOT employees or qualified persons retained by SCDOT. Persons performing these tests will not be involved in Acceptance Testing. This testing will be used to ensure that proper sampling and testing procedures are being followed, and that testing equipment is functioning properly. This testing will consist of observing sampling and testing by both SCDOT personnel performing Acceptance Testing and CONTRACTOR personnel

Clause Code:	009-QM-02
Clause Type:	Quality Management (Quality Control)
Project Name:	Interstate 85 and Interstate 385 Interchange Improvements
Owner Name:	South Carolina DOT
Year Published:	2014

V. QUALITY ASSURANCE PROGRAM

A. CONTRACTOR's Responsibilities

CONTRACTOR shall be responsible for the QUALITY CONTROL Portion of the Program to include the items listed below. Work shall not commence until CONTRACTOR has met these requirements.

1. **Quality Control Plan:** CONTRACTOR shall submit a Quality Control Plan that outlines how CONTRACTOR shall assure that the materials and work are in compliance with the drawings, plans, standard specifications, contract special provisions, SCDOT Construction Manual, Inspection Training Manuals, RFP and all attachments. The Quality Control Plan shall also include the specific portions of the Transportation Management Plan that address the work item. The initial plan shall be submitted to SCDOT for review and approval at least seven (7) days prior to any design or plan submittal or the beginning of any construction activity. The plan shall be updated as necessary prior to the start of any specific construction operation. The plan shall include a list of certified SCDOT personnel responsible for management and quality control of the Project, and define the authority of each individual. The plan shall also include how CONTRACTOR will monitor quality and deal with failing materials. CONTRACTOR shall include an estimated summary of quantities to SCDOT for the purposes of meeting the minimum sampling and testing requirements in accordance with the SCDOT Construction Manual.
2. **Personnel:** CONTRACTOR shall provide a sufficient number of SCDOT certified personnel to adequately control the work of the Project. Any personnel required to obtain samples or conduct material testing shall be certified or adequately trained and qualified as determined by SCDOT. Training, qualification, and/or certification shall include classroom training, written testing, documented demonstration of proper inspection, sampling and testing procedures, pre-employment training and an on-the-job training period. CONTRACTOR shall provide SCDOT with copies of each individual's training, qualifications, and/or certifications, in resume form, as required, for review and approval by SCDOT. Approved CONTRACTOR QC personnel shall be on the job at all times that the CONTRACTOR is on-site actively involved in work.
3. **CONTRACTOR Testing:** CONTRACTOR is required to conduct asphalt sampling and testing in accordance with QC/QA special provisions and supplemental specifications for asphalt included in **EXHIBITS 5 and 6** and the SCDOT Supplemental Technical Specifications. CONTRACTOR may elect to conduct other sampling and testing for its own benefit. The cost of these activities will be borne by CONTRACTOR. Additionally, CONTRACTOR is responsible for dynamic and static load testing of drilled shafts and piles in accordance with the requirements of **EXHIBITS 4 and 5**.

- Permits/Environmental Documents
- Safety Reports
- Meeting Minutes
- Issue Tracking Logs
- Submittal/RFI etc. Tracking Logs
- Delivery Tickets/Invoices as Applicable

Construction Directive Memorandum and all other applicable Reference Documents. This includes the documentation of construction activities and acceptance of manufactured materials.

VDOT's role during construction operations will be limited to verification sampling and testing, independent assurance, review and processing progress payments, and limited oversight of the Design-Builder's construction management scheduling, document control and other Project control and Project management/ administration efforts necessary to properly administer and manage the Project. All construction QA and QC personnel shall hold current VDOT materials certifications when testing hydraulic cement concrete, asphalt concrete, soils and aggregate, pavement markings and for the safety and use of nuclear testing equipment, as required by the VDOT Road and Bridge Specifications. The QA programs shall be performed under the direction of the QAM. The QC programs shall be performed under the direction of the Construction Manager. Substitution of either the Construction Manager or the QAM at any point during the Project shall require prior VDOT approval. In addition, VDOT shall have the right to order the removal of any construction QA and QC personnel, to include the QAM and the Construction Manager, for poor performance at the sole discretion of the VDOT Project Manager. The Construction Quality Management Plan shall include rapid reporting of non-compliance to the VDOT Project Manager, and the remedial actions to be taken as discussed in Section 105.12 of the Division 1 Amendments to the Standard Specifications.

The Design-Builder shall provide, prior to Final Application for Payment, a complete set of Project records that include, but are not limited to, the following:

- Project correspondence
- Project diaries (in electronic format)
- Test reports
- Invoices
- Materials Notebook
- Certified survey records
- DBE/EEO records
- Warranties
- Maintenance Manual
- As-Built and Record Documents
- Special Tools, etc.
- Buy American Compliance Certification

The Design-Builder shall be responsible to establish a Standard Filing System and Construction Document Management System (hard copy and electronic) for the duration of design/construction phase of the project. This filing system is subject to VDOT approval/acceptance. Hard copy documentation shall be accessible to VDOT and electronic access capability with shared access network as well. All documents, related to the following but not limited to, shall have electronic shared access as well as physical access:

- QC/QA Documentation
- Shop Drawings

Clause Code:	008-QM-01
Clause Type:	Quality Management (Quality Control)
Project Name:	Route 29/ Charlottesville Bypass Project
Owner Name:	Virginia DOT
Year Published:	2011

2.17.2 Construction Management

The Construction Quality Management Plan requires the Design-Builder to have overall responsibility for both the Quality Control (“QC”) and Quality Assurance (“QA”) activities as dictated in the VDOT Minimum Quality Control and Quality Assurance Requirements for Design-Build and Public Private Transportation Act Projects Manual. The Design-Builder shall be responsible for 100% QA work and QA sampling and testing for all materials used and work performed on the Project. These QA functions shall be performed under the direction of a Quality Assurance Manager (“QAM”) that represents an independent firm that has no involvement in the construction QC program/activities. The Design-Builder shall also be responsible for providing QA and QC testing for all materials manufactured off-site, including materials obtained from off-site borrow pits, but excluding the items listed below:

- Pipe (concrete, steel, aluminum and high density polyethylene) for culverts, storm drains and underdrains.
- Precast Concrete Structures.
- Metal Traffic Signal and Light Poles and Arms.
- Asphalt Concrete Mixtures.
- Aggregate (dense and open graded mixes).
- Prestressed Concrete Structural Elements.
- Structural Steel Elements

VDOT will provide plant quality assurance and plant testing of these items. In the event that VDOT determines that materials fail to meet the tolerances in the Road and Bridge specifications, a Non-Compliance Report (“NCR”) will be issued by the VDOT Project Manager and addressed to the Design-Builder’s QAM for resolution. The Design-Builder is responsible to submit a Source of Materials, Form C-25, for all materials VDOT retains responsibility for testing.

The Design-Builder’s QAM shall report directly to the Design-Builder’s Project Manager and be independent of the Design-Builder’s roadway, bridge and otherwise physical construction operations. The QAM shall be responsible for the QA inspection and testing of all materials used and work performed on the Project to include: monitoring of the Contractor’s QC activities, maintaining the Materials Notebook; documentation of all materials, sources of materials and method of verification used to demonstrate compliance with VDOT standards and Federal compliance (i.e. Buy American Special Provision). This includes all materials where QA testing is to be performed by VDOT. The QAM shall be vested with the authority and responsibility to stop any work not being performed according to the Contract requirements. The construction QA and QC inspection personnel shall perform all of the construction inspection and sampling and testing work that is normally performed by VDOT, as prescribed in the Construction Manual, Inspection Manual, Materials Manual of Instructions, active

Clause Code:	007-BET-02
Clause Type:	Betterment
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

III. CONTRACT TERMS AND CONDITIONS

<Omitted>

Design-Build Contract – Order of Precedence

(a) The contract includes the standard contract clauses and schedules current at the time of award. It also entails: (1) the solicitation in its entirety, including all drawings and illustrations, and any amendments during proposal evaluation and selection, and (2) the successful Offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of the various portions of this contract, precedence shall be given in the following order:

(1) Betterments: Any portions of the Offeror's proposal, which both meet and exceed the provisions of the solicitation.

addition shall not be treated as a change in the Work directed by WSDOT, and the Design-Builder shall not be entitled to any increase in the Contract Price or extension of the Contract Time on account thereof. Instead, the Design-Builder shall arrange to collect payment for such work directly from the Utility Owner. The Design-Builder shall promptly notify WSDOT of any request or requirement by a Private Utility Owner that the Design-Builder considers to give rise to a Betterment, and shall keep WSDOT informed as to the status of negotiations with the Private Utility Owners concerning such requests. If the Design-Builder and a Private Utility Owner disagree as to whether a particular Utility Owner request or requirement constitutes a Betterment, the Design-Builder shall notify WSDOT and shall resolve such dispute directly with the Utility Owner, subject to the requirements of Section 1-07.17(7).

1-07.17(7).1.2 Betterments for Public Utilities Any work with respect to a Public Utility that is required by an IGA (in its original form, absent any amendments entered into after the Proposal Due Date) shall not be considered a Betterment, whether or not treated as a Betterment as between WSDOT and the Utility Owner pursuant to said IGA. Any upgrades to existing facilities described in Exhibit A to such IGA with the City of **Sultan** are required, and shall be treated as part of the original scope of the Work. Any Utility Owner requests or requirements for a Public Utility Betterment shall be addressed pursuant to Section 1-04.4 and Section 1-08.8, as applicable.

1-07.17(7).2 Utility Owner Projects

The Design-Builder may enter into an agreement with a Utility Owner to design and/or construct a Utility Owner Project at the Utility Owner's expense, subject to compliance with Section 1-07.17(7).3. Any such Utility Owner Project shall be considered to be work outside of the Contract and the Work. The Design-Builder's compensation for a Utility Owner Project shall not involve WSDOT. Utility Owner Projects within the Project Right of Way are subject to normal WSDOT permitting requirements.

1-07.17(7).3 Restrictions on Betterments and Utility Owner Projects

Except as may be otherwise set forth in this Section 1-07.17(6) or in TR Section 2.10, all the terms and conditions of the Contract Documents that apply to the Utility Work shall apply to any Betterment added to the Work. The Design-Builder shall not proceed with any Private Utility Betterment or with any Utility Owner Project that is incompatible with the Project or cannot be performed within the constraints of applicable Governmental Rules, Governmental Approvals, any applicable franchises/permits and the Contract Documents, including the contractual deadline for Substantial Completion. The Design-Builder shall not be entitled to any additional compensation from WSDOT or any extension of the Contract Time on account of any Private Utility Betterment or any Utility Owner Project. The Design-Builder shall provide WSDOT with such information, analyses, and certificates as WSDOT may request in order to determine compliance with this Section 1-07.17(6).

<Omitted>

1-07.17(14).2 Changes in Utility Standards

There shall be no increase or decrease in the Contract Price pursuant to this Section 1-07.17 on account of any change in Utility Standards, whether or not such change qualifies as a Betterment. However, any change in Utility Standards that constitutes or results from a change in Governmental Rules may be grounds for a Change Order under other Contract provisions.

Clause Code:	006-BET-01
Clause Type:	Betterment
Project Name:	US 2 Rice Road Intersection Safety Improvement
Owner Name:	Washington State DOT
Year Published:	2011

1-01.3(1) DEFINED TERMS

<Omitted>

Betterment - With respect to the Technical Proposal, any item included in the Design-Builder's Technical Proposal which clarifies the Design-Builder's intention to exceed a requirement included in the Contract Documents.

Betterment (Utility) - With respect to a given Utility facility, any upgrading of such facility that is not attributable solely to the construction of the Project, and is made solely for the benefit of and at the election of the Utility Owner, including an increase in the capacity, capability, level of service, efficiency, duration, or function of the relocated or replaced or new facility over that which was provided by the existing facility; provided, however, that the following are not considered 19 Betterments:

- (a) Any upgrade necessary for safe and effective construction of the Project.
- (b) Replacement devices or materials that meet equivalent standards although they are not identical.
- (c) Replacement of devices or materials no longer regularly manufactured with the next highest grade or size.
- (d) Any upgrading required by applicable Governmental Rules.
- (e) Replacement devices or materials which are used for reasons of economy (e.g. non-stocked items may be uneconomical to purchase).
- (f) Any upgrading required by the Utility Owner's Utility Standards in effect as of the date of execution of the applicable Relocation Agreement.
- (g) Any discretionary decision by a Utility Owner contemplated within a particular Utility Standard. Notwithstanding the foregoing, in case of any discrepancy between the determination of applicable Utility Standards and/or the definition of "Betterment" set forth above, and the determination of applicable Utility Standards and/or the definition of Betterment in the Relocation Agreement applicable to a particular Utility, the terms of the Relocation Agreement shall apply.

Notwithstanding the foregoing, in case of any discrepancy between the determination of applicable Utility Standards and/or the definition of "Betterment" set forth above, and the determination of applicable Utility Standards and/or the definition of Betterment in the Relocation Agreement applicable to a particular Utility, the terms of the Relocation Agreement shall apply.

<Omitted>

1-07.17(7) BETTERMENTS AND UTILITY OWNER PROJECTS

1-07.17(7).1 Betterments

1-07.17(7).1.1 Betterments for Private Utilities

With respect to a Private Utility, Work that is identified in the Contract Documents as part of the Design-Builder's original scope shall not be considered a Betterment unless expressly identified as such in the Contract Documents. The Design-Builder may agree in a Relocation Agreement to design and/or construct a Betterment for a Private Utility at the Utility Owner's expense, subject to compliance with Section 1-07.17(7).3. Such Betterment shall be treated as an addition to the scope of the Utility Work upon WSDOT's approval and the parties' execution of such Relocation Agreement; however, such

D) The submittal does not qualify as an ATC but may be included in the Proposal without an ATC (i.e., the concept complies with the baseline RFP requirements).

E) The submittal does not qualify as an ATC and may not be included in the Proposal.

3.7.3 Incorporation of ATCs into Contract

Proposer may incorporate zero, one, or more Approved ATCs as part of its Proposal (including Conditionally Approved ATCs, if all conditions are met).

Department reserves the right to utilize all ATC concepts included in an unsuccessful Proposer's Proposal if the Proposer accepts the Stipend. See Appendix H for information pertaining to trade secret and rights to use ideas.

Following identification of the Preferred Proposer, the ATCs that were Approved by Department and incorporated in the Proposal by the Preferred Proposer shall be incorporated into the Contract Documents. If Department has Conditionally Approved any ATC by responding that the ATC was acceptable subject to certain conditions being met, those conditions will become part of the Contract Documents. The Contract Documents will be conformed after identification of the Preferred Proposer, but prior to execution of the Contract, to reflect the ATCs, including any Department conditions thereto. Notwithstanding anything to the contrary herein, if Design-Builder does not comply with one or more Department conditions of Approval for acceptance of an ATC, including obtaining any necessary third-party approvals, Design-Builder shall comply with the original requirements of the RFP without additional cost or extension of time as set forth in the Contract.

Prior to execution of the Contract, ATCs from unsuccessful Proposers may, in Department's sole discretion, be presented to the Preferred Proposer for possible incorporation in the Contract during finalization of the terms of the Contract pursuant to Section 6.3. In addition, following award, ATCs from unsuccessful Proposers may, in Department's sole discretion, be presented to the Preferred Proposer as a Department-Directed Change in accordance with the Contract.

Approval or Conditional Approval of an ATC by Department on this Project does not guarantee usage of the ATC concept on any other Department projects.

If the Proposer submits an ATC based on a proprietary product, they are solely responsible for meeting the requirements referenced in 23 CFR 635.411.

The Proposal Price should reflect any incorporated ATCs. Except for incorporating Approved ATCs, the Proposal may not otherwise contain exceptions to or deviations from the requirements of the RFP.

3.7.4 Confidentiality of ATCs

Subject to the provisions of the Public Records Act, all ATCs and all communications regarding ATCs will remain confidential until award or cancellation of the procurement, except that, upon identification of the Preferred Proposer, ATCs will be subject to disclosure to the Preferred Proposer. Upon award or cancellation, such confidentiality rights shall be of no further force and effect except as otherwise allowed under the Public Records Act and applicable Law. By submitting a Proposal containing an Approved ATC, Proposer agrees, if it is not selected, to the disclosure of its work product to the Preferred Proposer.

- C) Deviations. References to requirements of the RFP documents that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for Approval of such deviations;
- D) Analysis. An analysis justifying use of the ATC and why the deviations from the requirements of the RFP documents should be allowed;
- E) Impacts. Discussion of potential impacts on vehicular traffic, environmental impacts identified on appropriate environmental documents, community impact, safety and life-cycle Project impacts, and infrastructure costs (including impacts on the cost of repair and maintenance);
- F) History. A detailed description of other projects where the ATC has been used, the success of such usage, and names and telephone numbers of project owners that can confirm such statements;
- G) Risks. A description of added risks to Department and other Persons associated with implementing the ATC (e.g. maintenance, impacts to other design elements, etc.);
- H) Costs. Estimated price and cost impacts.

Proposer shall not make any public announcement or disclosure to third parties concerning any ATC until after Approval (including Conditional Approval) has been obtained. Following Approval (including Conditional Approval), if a Proposer wishes to make any such announcement or disclosure, it must first notify Department in writing of its intent to take such action, including details as to date and participants, and obtain Department's prior written consent in its sole discretion, to do so.

3.7.2 Review of ATCs

Department may request additional information regarding a proposed ATC at any time. Department will make every attempt to respond to the ATC in a timely manner. However, Department reserves the right not to respond to any ATC. Department and the Proposer can discuss ATCs at one-on-one meetings. Department's ATC response times and/or the one-on-one meetings will not be grounds for a protest.

Department will review each ATC and will respond to Proposer with one of the following determinations:

- A) The ATC is Approved.
- B) The ATC is not Approved.
- C) The ATC is not Approved in its present form, but may be Approved upon satisfaction, in Department's sole judgment, of certain identified conditions that shall be met or certain clarifications or modifications that shall be made (Conditionally Approved).

Clause Code:	005-ATC-02
Clause Type:	Alternative Technical Concepts
Project Name:	I-15 Cajon Pass Rehabilitation Design-Build Project
Owner Name:	California DOT
Year Published:	2013

3.7 Alternative Technical Concepts

Department has chosen to use the Alternative Technical Concepts (ATC) process set forth in this Section 3.7 to allow innovation and flexibility, to allow the design and construction to be completed together thereby minimizing conflicts and maximizing speed and efficiency, and ultimately to obtain the best value for the motoring public. Department will entertain ATC submittals that propose alternatives to any Section of Book 2 except for the following Books and Sections:

Book 2, Section 1 General
 Book 2, Section 2 Project Management
 Book 2, Section 4 Environmental Compliance
 Book 2, Section 19 Maintenance During Construction
 Book 2, Section 22 Stormwater

Proposers may propose alternatives that are equal to or better in quality or effect as determined by Department in its sole discretion and that have been used elsewhere under comparable circumstances.

3.7.1 Submittal of ATCs

A Proposer may include an ATC in its Proposal only if it has been received by Department by 3:00 p.m., Pacific Time, on the applicable ATC Submittal Due Date (identified in Section 2) and it has been Approved by Department (including Conditionally Approved ATCs, if all conditions are met). These submittal deadlines apply only to initial ATC submittals. Resubmittal of an ATC that has been revised in response to Department's requests for further information concerning a prior submittal shall be received by Department by 1:00 p.m., Pacific Time, within seven (7) days of Department's request. All ATC submittals and resubmittals shall be delivered to Department's Designated Contact specified in Section 3.3.

Each ATC shall be numbered sequentially, beginning with 1. Each ATC submittal shall be either e-mailed to Department's Designated Contact or hand delivered to Department at the address provided in Section 3.3. ATC submittals shall include five copies of a narrative description of the ATC and technical information, including drawings, as described below. If implementation of an ATC will require approval by a third party, Proposer will have full responsibility for, and bear the full risk of, obtaining any such approvals, except as expressly provided in the Contract.

ATC Submittal shall include:

- A) Description. A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions] and a traffic operational analysis);
- B) Usage. Where and how the ATC would be used on the Project;

e. ATC INCLUSION IN TECHNICAL PROPOSAL.

The Design Builder may incorporate one or more approved ATCs as part of its Technical and Price Proposals. If the Department responded to an ATC by stating that it would be approved if certain conditions were met, those conditions must be stipulated and met in the Technical Proposal. If the ATC is used in the submittal, the approved Form ATC shall be included in the Technical Proposal.

In addition to outlining each implemented ATC, and providing assurances to meet all attached conditions, the shall also include a copy of the ATC approval letter with approved form from the Department in the Technical Proposal within the Appendix and these will not count towards the page limit maximum; however, the ATC must be discussed within the Technical Proposal Response Category for scoring.

Approval of an ATC in no way implies that the ATC will receive a favorable review from the Design Build Review Committee. The Technical Proposals will be evaluated in regards to the evaluation criteria found in this **Contract Book 1 (ITDB - Instructions to Design Builders)**, regardless of whether or not ATCs are included.

The Price Proposal shall reflect all incorporated ATCs. Except for incorporating approved ATCs, the Technical Proposal may not otherwise contain exceptions to, or deviations from, the requirements of the RFP.

- 3) Deviations. References to all requirements of the RFP that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such variance(s).
- 4) Analysis. An analysis justifying use of the ATC and why the variance to the requirements of the RFP should be allowed.
- 5) Impacts. Discussion of potential impacts on vehicular traffic, environmental impacts identified, community impact, safety and life-cycle Project impacts, and infrastructure costs (including impacts on the cost of repair and maintenance).
- 6) History. A detailed description of other projects where the ATC has been used, the success of such usage, and names and telephone numbers of project owners that can confirm such statements.
- 7) Risks. A description of added risks to the Department and other entities associated with implementing the ATC; and
- 8) Costs. A description of the ATC implementation costs to the Department, the Design–Builder, and other entities (right-of-way, utilities, mitigation, long term maintenance, etc.).

The ATC, if approved, shall be included in the Price Proposal if the Design–Builder elects to include it in their Technical Proposal.

<Omitted>

c. REVIEW OF ATCS.

A panel will be selected to review each ATC, which may or may not include members of the Design Build Review Committee. The Design Builder shall make no direct contact with any member of the review panel, except as may be permitted by the Department Alternative Contracting C.E. Manager 2. Unapproved contact with any member of the review panel will result in a disqualification of that ATC.

The Department may request additional information regarding a proposed ATC at any time. The Department will return responses to, or request additional information from, the within five (5) business days of the original submittal. If additional information is requested, the Department will provide a response within five (5) business days of receipt of all requested information.

Under no circumstances will the Department be responsible or liable to the Design Builder or any other party as a result of disclosing any ATC materials, whether the disclosure is deemed required by law, by an order of court, or occurs through inadvertence, mistake or negligence on the part of the Department or their respective officers, employees, contractors, or consultants.

d. THE DEPARTMENT RESPONSE

The Department will review each ATC and will respond to on Form ATC as shown in **Contract Book 3 (Project Specific Information)** with one of the following determinations:

- 1) The ATC is approved.
- 2) The ATC is not approved.
- 3) The ATC is not approved in its present form, but may be approved upon satisfaction, in the Department's sole discretion, of certain identified conditions that shall be met or certain clarifications or modifications that shall be made (conditionally approved).
- 4) The submittal does not qualify as an ATC but may be included in the Proposal without an ATC (i.e., the concept complies with the baseline requirements of the RFP Documents).
- 5) The submittal does not qualify as an ATC & may not be included in the Proposal; or
- 6) The ATC is deemed to take advantage of an error or omission in the RFP, in which case the ATC will not be considered, and the RFP will be revised to correct the error or omission.

Clause Code:	004-ATC-01
Clause Type:	Alternative Technical Concepts
Project Name:	I-40 Interchange at SR 22 (Exit 42)
Owner Name:	Tennessee DOT
Year Published:	2012

2. ALTERNATIVE TECHNICAL CONCEPTS – SUBMITTAL REQUIREMENTS AND AUTHORIZATION TO USE

a. INFORMATION

To accommodate innovation that may or may not be specifically allowed by the RFP Documents, the Design Builder has the option of submitting Alternative Technical Concepts.

An Alternative Technical Concept (ATC) is a private query to the Department that requests a variance to the requirements of the RFP or other Contract Documents that is equal or better in quality or effect as determined by the Department in its sole discretion and that have been used elsewhere under comparable circumstances.

The Design Builder may include an ATC in the Proposal only if the ATC has been received by the Department by the deadline identified in this **Contract Book 1 (ITDB - Instruction to Design Builders)** and it has been approved by the Department.

The submittal original deadline applies only to initial ATC submittals. Resubmittal of an ATC that has been revised in response to the Department's requests for further information concerning a prior submittal shall be subsequently received as directed by the Department.

An ATC shall in no way take advantage of an error or omission in the RFP. If, at the sole discretion of the Department, an ATC is deemed to take advantage of an error or omission in the RFP, the RFP will be revised without regard to confidentiality.

By approving an ATC, the Department acknowledges that the ATC may be included in the design and RFC (Readiness-for-Construction) plans; however, approval of any ATC in no way relieves the Design Builder of its obligation to satisfy (1) other Contract requirements not specifically identified in the ATC submittal; (2) any obligation that may arise under applicable laws and regulations; and (3) any obligation mandated by the regulatory agencies as a permit condition.

A proposed ATC is not acceptable if it merely seeks to reduce quantities, performance, or reliability, or seeks a relaxation of the contract requirements. ATCs shall be submitted by the Design Builder and pre-approved in writing by the Department. All Technical Proposals must include the Department's pre-approval letters for consideration of the ATCs.

b. SUBMITTAL REQUIREMENTS

Each ATC submittal shall include two (2) individually bound copies and shall use Form ATC located in **Contract Book 3 (Project Specific Information)**. Each ATC shall include the following information:

- 1) Description. A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions] and a traffic operational analysis, if appropriate).
- 2) Usage. Where and how the ATC would be used on the Project.

Clause Code:	001-BC-03
Clause Type:	Basic Configuration
Project Name:	Interstate 405 Corridor Project
Owner Name:	Washington State DOT
Year Published:	2005

0-02.3 BASIC CONFIGURATION

The following design components shall be deemed Basic Configuration elements for the Project. The descriptions in this section are not intended to describe the scope of work, rather specific features and tolerances for defining the Basic Configuration.

Horizontal and Vertical Roadway Alignments:

The Horizontal and Vertical Roadway Alignments shall be as defined on the Alignment and Paving Plans and Profile and Super Elevation Plans respectively. Horizontal Alignments may be adjusted by up to ten feet, and Vertical Alignments may be adjusted by up to two feet in any direction, providing that all of the following conditions are met: 1.) The final Cut/Fill limits remain within the Impact Area Line as shown on the Conceptual Plans, 2.) The adjustments do not result in the need to acquire additional right-of-way, 3.) The adjustments do not result in net increases to impacts of wetlands, wetland buffers, or other environmentally sensitive areas that are depicted on the Conceptual Plans, and 4.) All other design standards and criteria are met, or exceeded as described in the Contract Documents.

Noise Walls:

Horizontal and vertical noise wall alignments shall be as defined on the Alignment and Paving Plans, and Retaining and Noise Wall Profile Plans. At a minimum, noise walls N3, R2 and U4 must be constructed to the horizontal and vertical limits depicted on the Conceptual Plans. Noise wall alignments may be adjusted by up to four feet in offset to the roadway, but the limits and top of wall profile shall not be reduced from that shown in the Conceptual Plans. If the Design-Builder chooses to shift the roadway horizontal alignment by more than two feet, and/or the roadway vertical profile by more than one foot, a new or supplemental noise analysis report must be submitted to [Washington State] DOT for approval. The Design-Builder shall be responsible for the design and construction of all additional noise barriers that any noise study supplements indicate are necessary to meet the noise abatement standards described in the Contract Documents. In no circumstance can the basic configuration of the noise walls, as depicted on the Conceptual Plans, be reduced except that the top of wall elevations may be reduced to a minimum of 10-feet above the nearest edge line if supported by the supplemental noise analysis report.

NE 116th Street Interchange Type:

The interchange type selection of a $\frac{1}{2}$ Single Point Urban Interchange at NE 116th Street/ I-405 is a basic configuration element. Design refinements are encouraged by the Design-Builder within the parameters of the other basic configuration elements as described in this section. An alternative interchange type may be developed and submitted for approval to [Washington State] DOT, but the following conditions must be met: 1.) Alternative designs must demonstrate forward compatibility with the I-405, SR520 to SR522 Stage 2 and Implementation Plan projects. This will require full development of a channelization plan for approval for each of the two future projects, and an interchange type selection submittal. 2.) A supplemental traffic analysis report must be submitted to [Washington State] DOT for approval as part of the interchange type selection submittal, 3.) A supplemental noise study report must be submitted for approval, and 4.) Renderings for the bridge over NE 116th Street must be developed to solicit Context Sensitive Solutions from [Washington State] DOT and the City of Kirkland Advisory Committee.

Clause Code:	003-BC-02
Clause Type:	Basic Configuration
Project Name:	Ambassador Bridge Plaza – Gateway Completion
Owner Name:	Michigan DOT
Year Published:	2012

PROJECT REQUIREMENTS**BOOK 2****1 GENERAL****1.3 Project Description*****1.3.3 Basic Configuration***

The Preliminary Design Drawings provided in the RID convey the general intent of the Project. The Basic Configuration means those portions of the Preliminary Design Drawings that depict:

1. The horizontal alignment for the Truck Road connecting I-75 and the Cargo Inspection Facility, except that this alignment may be modified up to one foot.
2. Number and width of lanes (indicated widths are minimums) of roadways
3. Names of roadways

Approval by [Michigan] DOT is required prior to commencing any Work that would necessitate a modification in the Basic Configuration.

Right-of-Way	Traffic Control
022-ROW-01	044-TC-01
023-ROW-02	045-TC-02
Utility Relocation	Warranty
024-UR-01	046-WA-01
025-UR-02	047-WA-02

Clause Code:	002-BC-01
Clause Type:	Basic Configuration
Project Name:	US 90 (I-49 South) Albertson's Parkway to Ambassador Caffery Design-Build Project
Owner Name:	Louisiana DOT
Year Published:	2013

REQUEST FOR PROPOSAL

Part 1 Design Build Agreement

Appendix A Project Scope

5.0 BASIC PROJECT CONFIGURATION

The Basic Project Configuration shall consist of the following:

- A) The horizontal and vertical alignments;
- B) Number of interchanges;
- C) Number of bridges;
- D) Number of lanes (except for tapers, transitions, and intersections);
- E) The general location of the limits of the Project;
- F) The minimum vertical and horizontal clearances;
- G) The Right-of-Way (ROW) limits; and
- H) Control of Access Limits.

5.1 STANDARD FOR DETERMINING MATERIALITY OF CHANGE IN BASIC PROJECT CONFIGURATION

The following are the standards for determining materiality of Basic Project Configuration changes:

- A) Any change to the Project that affects the Project ROW limits or the minimum vertical and/or horizontal clearances;
- B) A change in the termini of the Project (either or both) by more than one hundred feet longitudinally; and/or
- C) Any change in Section 5.1(A) through (B) requiring a change in the permits secured from the United States (US) Army Corps of Engineers (COE).

Refer also to:

Contract Documents, Part 2 – DB Sections 100s, DB Section 104.

APPENDIX C

AASHTO Guide for Design-Build Procurement Provision Updates

Table C.1. Provisions to be added to *AASHTO Guide for Design-Build Procurement*.

Contract Provisions	
Basic Configuration	Order of Document Precedence
001-BC-01	026-ODP-01
002-BC-02	027-ODP-02
003-BC-03	
Alternative Technical Concepts	Reference Documents
004-ATC-01	028-REF-01
005-ATC-02	029-REF-02
Betterment	Ownership of Documents
006-BET-01	030-DO-01
007-BET-02	031-DO-02
Quality Management	Stipend
008-QM-01	032-STP-01
009-QM-02	033-STP-02
010-QM-03	
Design Submittal, Review, and Approval	Payment Method
011-DSRA-01	034-PAY-01
012-DSRA-02	035-PAY-02
013-DSRA-03	036-PAY-03
Engineer of Record	Progress Schedule
014-EOR-01	037-PS-01
015-EOR-02	038-PS-02
Differing Site Conditions	Project Acceptance
016-DSC-01	039-ACC-01
017-DSC-02	040-ACC-02
018-DSC-03	041-ACC-03
Environmental Permitting	Nonconforming Work
019-EP-01	042-NCW-01
020-EP-02	043-NCW-02
021-EP-03	

Figure B30.1. Rendering of intersection reconfiguration (Source: Florida Department of Transportation).

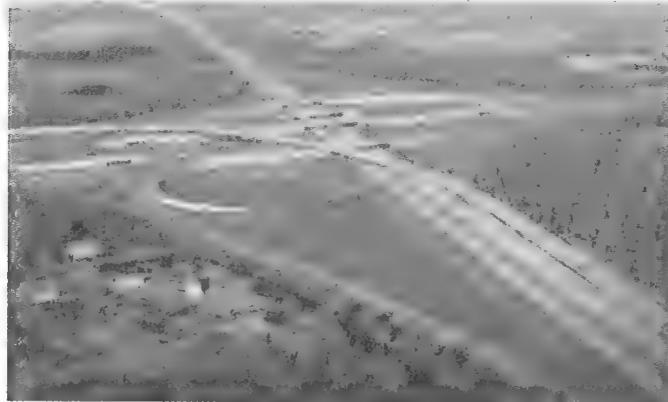


Table B30.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> Confidential one-on-one meetings for ATCs Cost-Savings Initiative (CSI) Computer based D-B training for technical committee members
2. Administer D-B Design	<ul style="list-style-type: none"> 3rd-party review (Design firm and firm that wrote the RFP) Changing plan standards for D-B Design
3. Administer D-B Construction	<ul style="list-style-type: none"> PR staff utilized, open houses, flyers, etc. “Hold Points” variation used (driven piles)
4. Administer D-B Closeout	<ul style="list-style-type: none"> CPPR Rating—Contractor Past Performance Rating

Table B29.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Kickoff meeting • Partnering meetings • Progress meetings, weekly • Contract and RFP • Co-location • Over-the-shoulder reviews • FHWA and Georgia DOT Oversight Agreement
2. Administer D-B Design	<ul style="list-style-type: none"> • Discipline review checklist tied to Georgia DOT standards and project contract • e-Builder cloud-based construction management software • Submittal guide and index
3. Administer D-B Construction	<ul style="list-style-type: none"> • Critical Activity Plan (CAP) defines hold points • Assure-It materials data base
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

Case Study 30. I-95 at I-295 Interchange (D-B), Florida

Project Name: I-95 at I-295 Interchange

Name of Agency: Florida Department of Transportation

Location: Jacksonville, Florida, Duval County

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$176.9 million

Construction Schedule: July 2016–Fall 2020

Project Description: The interchange at I-95 and I-295 North will be modernized and reconfigured to improve traffic flow, safety, and increase capacity. The project includes a collector distributor system, which allows motorists traveling along I-295—whether exiting or passing through—to maneuver through the interchange with few lane shifts (Figure B30.1). Auxiliary lanes and minor ramp improvements will be added to I-95 and the Airport Road interchange. The Cole Road Bridge over I-95 is also being replaced. I-295 North and US 17 are also under construction, including bridge replacement–construction, ramp reconstruction, and road work along US 17. A summary of the initial tools for the investigation is shown in Table B30.1.

Case Study 29. Northwest Corridor Express Lanes (D-B), Georgia

Project Name: Northwest Corridor Express Lanes

Name of Agency: Georgia Department of Transportation

Location: I-75 from Akers Mill Road to Hickory Grove Road and along I-575 from I-75 to Sixes Road northwest of downtown Atlanta, Georgia.

Project Delivery Method–Procurement–Contract Type: P3 with a Design–Build–Finance–Best Value–Lump Sum

Total Project Cost: \$598.5 million administration cost, with an additional \$18.2 million community improvement district project.

Construction Schedule: October 2014–Summer 2018

Project Description: This project involves the construction of 29.7 miles of two reverse toll lanes along I-75 from Akers Mill Road to Hickory Grove Road and along I-575 from I-75 to Sixes Road (Figure B29.1). Two express lanes will be built to the west of the existing lanes along I-75 between I-285 and I-575. From that interchange, one express lane will be added along I-75 north to Hickory Grove Road and one express lane will be added along I-575 to Sixes Road. Construction will include roadway, bridges, MSE walls, sound barrier walls, ramps, and tolls. The design–builder will be NorthWest Express Road–Builders, a joint venture between Archer Western Contractors, Hubbard Construction Company, and the Parsons Transportation Group, who serve as lead engineering designers. A summary of the initial tools for the investigation is shown in Table B29.1.



Figure B29.1. Northwest Corridor express lanes (Source: Georgia Department of Transportation).

Table B28.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> Over-the-shoulder reviews Collocation Standard template for the design-build contracts. ATCs from procurement process Early geometric drawings Partnering Meeting: agenda, list of questions Training: description or agenda of 2-week training for agency staff to learn how to procure and administer a D-B project Roles and responsibilities: table or list Team members are hand-picked
2. Administer D-B Design	<ul style="list-style-type: none"> Three specified reviews for every design package, described in contract Internal database to manage reviews: sample spreadsheet Joint comment resolution meeting with the design builder: sample agenda Guidance for reviewers to focus on contract and standards Flow chart for design exceptions FHWA involvement Weekly task force meetings: list of task forces; example table for tracking status Tracking Multiple package: example spreadsheet or index for folders on server Description of how progress payments are made
3. Administer D-B Construction	<ul style="list-style-type: none"> Independent Quality Assurance (IQA) description of software QMOS Training for inspectors: description or agenda Refresher training for inspectors: description, agenda IPads for inspection: description of use Partnering session with only inspectors and construction field employees: agenda Monthly meeting with community: sample agenda Public outreach: list of contract requirements
4. Administer D-B Closeout	<ul style="list-style-type: none"> Lesson learned

Case Study 28. I-15-I-215 Devore Interchange Improvements (D-B), California

Project Name: I-15-I-215 Devore Interchange Improvements

Name of Agency: California Department of Transportation with cooperation with San Bernardino Associated Governments

Location: I-15 and I-215, San Bernardino County, California

Project Delivery Method—Procurement—Contract Type: D-B—Best Value—Lump Sum

Total Project Cost: \$208 million

Construction Schedule: December 2012–September 2016 (Final acceptance April 2017)

Project Description: This project reconfigured Interstate 15 and Interstate 215 Interchange near Devore within San Bernardino County (Figure B28.1). Improvements included adding one new lane in each direction, a new northbound main line for I-15, a truck bypass lane in each direction, and reconnecting the historic Route 66, which was severed in construction 40 years ago. Also included were 18 bridges and drainage structures. Work required construction over three railroad tracks. Construction accommodated environmental permits related to the kangaroo rat, an endangered species. The design–builder was Atkinsons Contractors, LP and URS Corporation. The project received multiple awards including multiple partnering awards, award for best project in California ENR, AECOM roadway project of the year, and runner-up on CTS competition. A summary of the initial tools for the investigation is shown in Table B28.1.

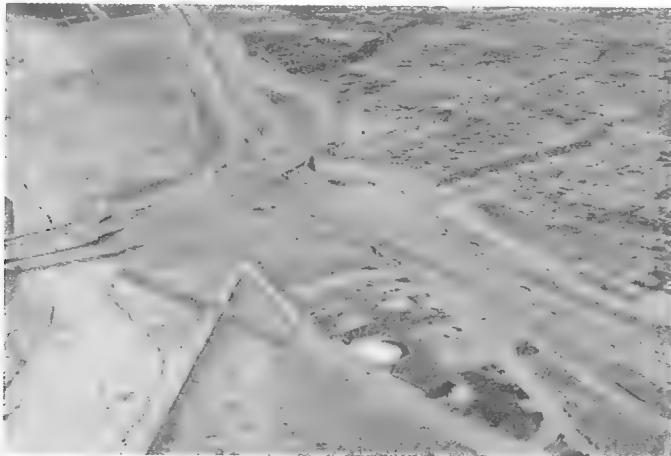


Figure B28.1. I-15 and I-215 Devore Interchange
(Source: California Department of Transportation).

Case Study 27. MD 404-US 50 to East Holly Road (D-B), Maryland

Project Name: MD 404-US 50 to East Holly Road

Name of Agency: Maryland Department of Transportation State Highway Administration

Location: Talbot County, Queen Anne's County, and Caroline County, Maryland

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$105 million D-B contract, with \$5 million “No Excuse” incentive for substantial completion

Construction Schedule: June 2016–November 2017 (substantial)–July 2018 (final)

Project Description: This project involved the design and construction of a four-lane divided highway on MD 404 from US 50 to East Holly Road, approximately 9 miles (Figure B27.1). The pavement cross-section included travel lanes that were 12 feet, inside shoulders that were 4 feet, and outside shoulders of 10 feet. The median was 34 feet with a traffic barrier. Improvements included new pavement, pavement rehabilitation, a new bridge over Norwich Creek, box and pipe culverts, signing, marking lighting, ITS, and 120 acres of right-of-way acquisition. A summary of the initial tools for the investigation is shown in Table B27.1.

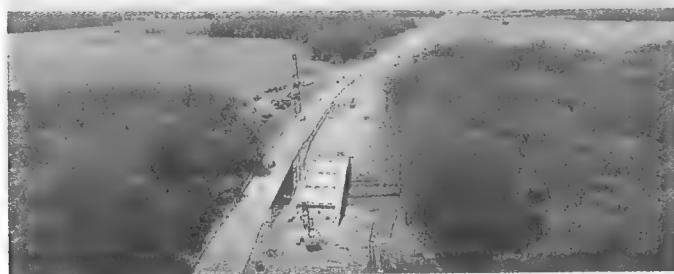


Figure B27.1. MD 404 (Source: Maryland Department of Transportation State Highway Administration).

Table B27.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Overview of FHWA Involvement on ACM Projects (FHWA Non-exempt Review Process, Table IV-1) • Partnering • ACM training (PowerPoint training presentation for designers) • Maryland DOT State Highway Administration Design Build Manual, Jan. 2013
2. Administer D-B Design	<ul style="list-style-type: none"> • Independent party design review (Independent Design Quality Assurance [IDQA] hired by D-B) • Design Quality Assurance Audits
3. Administer D-B Construction	<ul style="list-style-type: none"> • None
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

the acceleration and deceleration lanes between ramps, remove and replace nine vehicular bridges and two pedestrian bridges, widen existing shoulders, add new shoulders, add multi-use path, construct retaining walls, install 15 miles of ITS, and improve 20 miles of signage (Figure B26.1). The design-builder will be Flatiron Constructors, Inc., Bly the Development Company Joint Venture, and HDR Engineering, Inc. A summary of the initial tools for the investigation is shown in Table B26.1.



Figure B26.1. Rendering of Peters Creek Parkway Bridge (Source: North Carolina Department of Transportation).

Table B26.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Kickoff meeting • Scoping checklist for stakeholder involvement
2. Administer D-B Design	<ul style="list-style-type: none"> • D-B Submittal Guidelines, May 2009 • Express D-B Bridge Replacement, Submittal Guidelines, Year 5, March 2016 • Geotechnical Guidelines for D-B Projects, June 2009 • Guidelines for the Preparation of Signing and Final Pavement Marking Plans for D-B Projects, May 2016 • Guidelines for the Preparation of ITS and Signal Plans by Private Engineering Firms, April 2014 • Guidelines for the Preparation Signing Plans for D-B Projects, Aug. 2007 • Guidelines for the Preparation Traffic Control and Pavement Marking Plans for D-B Projects, Aug. 2008 • Roadway Design Guidelines for D-B Projects, Aug. 2016 • State D-B office distributes all D-B submittals
3. Administer D-B Construction	<ul style="list-style-type: none"> • D-B Contract Administration Guidelines • ACM public announcement
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

Table B25.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities (Partnering materials that emphasize new/different roles in a D-B project; RFP; Contract; PMP; QMP) • Partnering • Example scenario to discuss QA-QC-QV roles • ACM training (Washington State DOT D-B Training modules; Contractor D-B Training: including video and PowerPoint) • Co-location
2. Administer D-B Design	<ul style="list-style-type: none"> • Road map for tech reports • Cover memo for design submittals that provides context to reviewer; what is and is not for construction • Contract file index (App.F14, for document control)
3. Administer D-B Construction	<ul style="list-style-type: none"> • Commitment database-summarizing permit commitments • Incentives: environmental and pavement smoothness • Transfer of franchise rights • Emergency contact cards • Training (for federal auditors on how to interpret D-B invoices) • Tracking sheet for as-builts
4. Administer D-B Closeout	<ul style="list-style-type: none"> • Checklist for administrative items at closeout, or email or memo describing deficiencies • Spreadsheet listing all contractor action items organized by Preconstruction, Construction, and Post construction

Case Study 26. Business 40 (Salem Parkway) (D-B), North Carolina

Project Name: Business 40 (Salem Parkway)

Name of Agency: North Carolina Department of Transportation

Location: Business 40 highway west of 4th Street to east of Church Street

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$99.2 million

Construction Schedule:

Segment A: Fall 2017–Fall 2018

Segment B: Fall 2019–Su 2020

Segment C: Fall 2018–Fall 2019

Segment D: Su 2018–Fall 2018

Project Description: Construction for segments A–D, covering 1.2 miles, will remove and replace the existing pavement with new concrete, modernize entrance and exit ramps, lengthen

Case Study 25. I-405, NE 6th Street to I-5 (Bellevue to Lynnwood) Widening and Express Toll Lanes Project (D-B), Washington

Project Name: I-405, NE 6th Street to I-5 Widening and Express Toll Lanes Project

Name of Agency: Washington State Department of Transportation

Location: Seattle metro area, I-405 from NE 6th Street in Bellevue to I-5 in Lynnwood

Project Delivery Method—Procurement—Contract Type: D-B—Best Value—Lump Sum

Total Project Cost: \$155.5 million

Construction Schedule: February 2012–August 2017. Express toll lanes opened to traffic on September 27, 2015.

Project Description: Between downtown Bellevue and SR 522 in Bothell, Washington State DOT and the design–builder added one lane in each direction and converted the existing carpool lane to a dual express toll lane system with dynamic pricing (Figure B25.1). Between SR 522 in Bothell and I-5 in Lynnwood, Washington State DOT and the design–builder converted the existing carpool lane to a single express toll lane. The construction scope also included a new northbound braided ramp system to improve traffic operations between the NE 160th Street and SR 522 interchanges, wider shoulders for buses in two areas of southbound I-405, seven new noise walls, one noise berm, and environmental mitigation, including stormwater enhancements. The design-build contract was with Flatiron Constructors. A summary of the initial tools for the investigation is shown in Table B25.1.



Figure B25.1. *New I-405 dual express toll lane system in Kirkland, Washington (Source: Washington State Department of Transportation).*

Case Study 24. I-25-Cimarron Interchange (D-B), Colorado

Project Name: I-25–Cimarron Interchange Phase 2

Name of Agency: Colorado Department of Transportation

Location: Colorado Springs, Colorado, at I-25 Interchange between Colorado Avenue (north) and South Nevada Avenue (south), 8th Street (west), and the Cimarron Street (US 24) bridge over Fountain Creek (east)

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$72 million

Construction Schedule: March 2015–November 2017

Project Description: The project consisted of rebuilding the interchange with new bridges on I-25 and US 24, improved trail connectivity, and a new connection between 8th Street and Cimarron Street (Figure B24.1). Improvements included bridges, ramps, additional lanes, overlay, signals, stream channel reconstruction, multi-use trail extension, pedestrian bridge, and landscaping. The D-B contract was with Kraemer North America, LLC; and the lead designer was Tsiouvaras Simmons Holderness. A summary of the initial tools for the investigation is shown in Table B24.1.

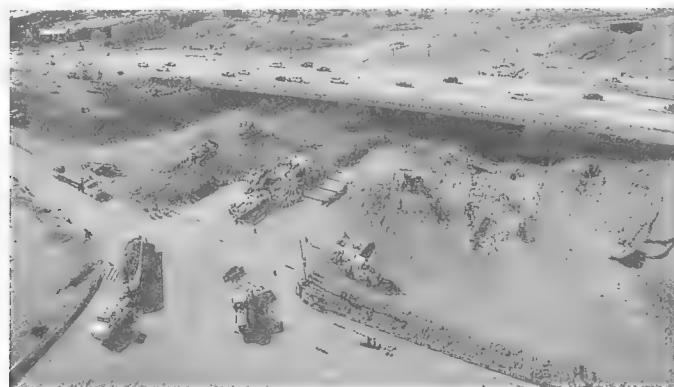


Figure B24.1. I-25 bridge demolition
 (Source: Colorado Department of Transportation.
 Photograph courtesy Cherry Creek Recycling).

Table B24.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> • ACM roles and responsibilities (communicated during the RFQ and RFP stages, and in the one-on-one meetings (4 hrs.) with D-B teams) • D-B champion (to keep all team members on track with the D-B process) • Partnering (Project First system)
2. Administer D-B Design	<ul style="list-style-type: none"> • Document specialist: not only to save and organize documents, but to remind people what documents they need to submit by when (request job description of document control person) • Witness and hold points
3. Administer D-B Construction	<ul style="list-style-type: none"> • None
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None



Figure B23.1. St. Louis District Safety Project Improvement location (Source: Missouri Department of Transportation).

Table B23.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Partnering meeting • Kickoff meeting • RFP and contract • Chief Engineer Authorization • Continuity of key personnel • FHWA oversite agreement • Co-location (description in RFP)
2. Administer D-B Design	<ul style="list-style-type: none"> • Audits • External SharePoint Workflow process • Permit log ▪ Discipline Task Force meeting • Over-the-shoulder meetings for disciplines, except the Safety project had the entire team meet weekly • SharePoint folder organization, 1000–9000 • Additional Applicable Standard (AAS) form
3. Administer D-B Construction	<ul style="list-style-type: none"> • Workflow sheet to track what materials • Hold points (in Quality Management Plan)
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

Table B22.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> Continuity of key personnel RFP Instructions to Proposers sections 1.11 and 1.15 D-B Procedures Manual I of V, 2011 D-B Procedures Manual III of V, 2011 D-B Procurement Process Report, 2003 D-B Practice Report, 2002 Informal partnering, RFP Part 2, D-B 103-2 Prework meeting to highlight key differences for D-B roles and responsibilities (Agenda) Training class for employees new to D-B-PowerPoint presentations or other training materials
2. Administer D-B Design	<ul style="list-style-type: none"> Design Review Checklist D-B specific folder layout structure for ProjectWise, New York State DOT Project Development Manual, Appendix 14 (obtained)
3. Administer D-B Construction	<ul style="list-style-type: none"> NCR light spreadsheet used for tracking
4. Administer D-B Closeout	<ul style="list-style-type: none"> Project Quality Assurance Report-template or outline

Case Study 23. St. Louis District Safety Project (D-B), Missouri

Project Name: St. Louis District Safety Project

Name of Agency: Missouri Department of Transportation

Location: Projects are divided across 31 locations across Franklin and St. Charles Counties, Missouri. Key locations include Route 47 from Route 50 to the North Outer Road in Franklin County, as well as Route 94 from Siedentop Road to Route 364 in St. Charles County

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$24.11 million

Construction Schedule: July 2017–November 2018

Project Description: Safety improvements at 31 locations will occur. The D-B team was selected partly because of the estimated number of lives that could be saved for each location. These improvements include right turn angle changes, intersection warning systems, pavement treatments, reflective pavement markers, rumble strips, and flashing stop signs (Figure B23.1). The design-build team includes NB West Contracting Company, Horner & Shifrin, Inc., Lochmueller Group, and Engineering Design Source, Inc. A summary of the initial tools for the investigation is shown in Table B23.1.

Case Study 22. Wellwood Avenue over Route 27 (D-B), New York

Project Name: Wellwood Avenue over Route 27

Name of Agency: New York State Department of Transportation

Location: Town of Babylon, Suffolk County

Project Delivery Method/Procurement/Contract Type: D-B/Best Value/Lump Sum

Total Project Cost: \$20.4M

Construction Schedule: Spring 2016—Summer 2017

Project Description: This project involved construction of a new bridge with two travel lanes, shoulders, and sidewalks (Figure B22.1). The existing bridge, built in 1961, carried over 90,000 vehicles per day. Construction also included new bridge approaches, guardrail, parapet walls, pavement, striping, and a slight widening of Wellwood Avenue. Travel remained open during peak hours while construction took place with some temporary closures during off-peak hours. Active construction activities were limited to off-peak hours. The design-builder was Posillico Civil, Inc. A summary of the initial tools for the investigation is shown in Table B22.1.



Figure B22.1. Wellwood Avenue Bridge
(Source: New York State Department of Transportation).

special permission to construct outside the typical construction season window of December 1 through April 15. The project was constructed in three phases. The first phase was a new section of the bridge between the existing bridges. In the second phase, the west side bridge was demolished and replaced, followed by the east side in the third phase. The design-build team included Tetra-Tech Construction and URS. EIV was the quality assurance manager for the D-B team. A summary of the initial tools for the investigation is shown in Table B21.1.

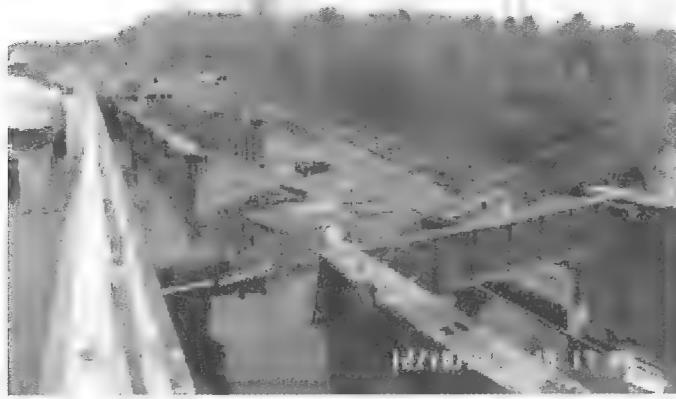


Figure B21.1. I-89 Bridge (Source: Vermont Department of Transportation).

Table B21.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Roles and responsibilities in the RFP • Permitting kickoff meeting • Project kickoff meeting
2. Administer D-B Design	<ul style="list-style-type: none"> • FHWA design-build activity guideline • VTrans changes to key personnel guidelines • Role of ECO (in RFP) • Submittal summary sheet (example from the Burlington project) • Over-the-shoulder reviews • Discipline review meeting
3. Administer D-B Construction	<ul style="list-style-type: none"> • Material Acceptance Plan from the Burlington project • Hold points described in RFP
4. Administer D-B Closeout	<ul style="list-style-type: none"> • Punch list descriptions in RFP

Table B20.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B and DOT	<ul style="list-style-type: none"> ACM public announcement: newsletter note on pre-fabricated bridge units, PBU RFP-spec for QMP RFP-spec for QC plans RFP-spec for public outreach RFP-spec for TMP ACM kickoff meeting (pre-construction meeting) sample agenda Preproposal meeting PowerPoint Training workshop for industry: sample agenda, PowerPoints Training workshop for agency staff: sample agenda, PowerPoints RFP-specs for over the shoulder reviews RFP-guidelines for ERC and final submittal
2. Administer D-B Design	<ul style="list-style-type: none"> In the plan table of contents, plan sheets not included in a submittal were grayed out. Sample plan sheet with grayed line in table of contents from E. Hartford Excel spreadsheet for tracking design submittals Route 8 Project agreement with FHWA Connecticut DOT Steward agreement with FHWA RFP-spec for key personnel on site for specified activities
3. Administer D-B Construction	<ul style="list-style-type: none"> Guidance on QC for contractor and QA for owner Spreadsheet used to check pay applications. Guidance on how to check performance and not pay for work not meeting performance standards
4. Administer D-B Closeout	<ul style="list-style-type: none"> Lessons Learned from Route 8 D-B

Case Study 21. Milton IM 089-3 (66) (D-B), Vermont

Project Name: I-89 Bridges over Lamoille River

Name of Agency: Vermont Department of Transportation (VTrans)

Location: I-89 over the Lamoille River, Milton, Vermont

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$23.5 million

Construction Schedule: Fall 2013–August 2017

Project Description: The project replaced the two 1967-era bridges for northbound and southbound traffic over the Lamoille River with one bridge (Figure B21.1). The new 106-feet wide bridge is three spans with steel girders. Maritime traffic remained open during construction. A barge system was implemented for construction in the river. An endangered species of mussels needed to be relocated before construction started. This project received

Case Study 18. Lahaina Bypass Phase 2 (D-B), Maui, Hawaii (HDOT) and Lakewood, Colorado (Central Federal Lands)

Project Name: Lahaina Bypass 1B-2

Name of Agency: Central Federal Lands with Hawaii Department of Transportation

Location: From the southeastern termini of the previous 1B-1 phase and southeast to the existing Honoapiilani Highway (State Route 30) near cut mountain.

Project Delivery Method–Procurement–Contract Type: D-B–Low Bid–Lump Sum

Total Project Cost: \$38.6 million

Construction Schedule: January 2017–January 2018

Project Description: The project consisted of designing 2.7 miles to accommodate a divided four-lane highway (Figure B18.1). However, only two of the four lanes will be built initially. Construction included concrete pavement, earth embankments, culvert drainage crossings (corrugated metal pipe and concrete box culverts), a Geotextile Reinforced Soil over-crossing bridge structure at Punakea Street, drainage detention basins, two at-grade signalized intersections (Kai Hele Ku and Hokiokio Place), and a southern connector road. A summary of the initial tools for the investigation is shown in Table B18.1.

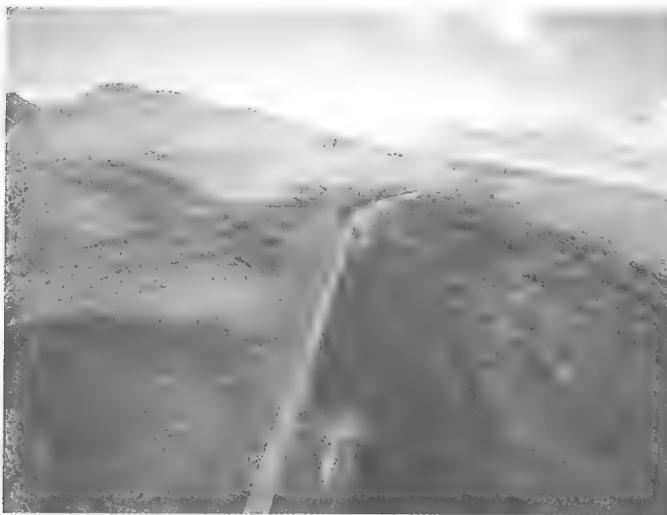


Figure B18.1. Lahaina Bypass Phase 2
(Source: Hawaii Department of Transportation and Central Federal Lands).

Table B18.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Collocation • ACM roles and responsibilities (in contract) • Meet with regulatory agencies to educate them about the D-B process and why a contractor is involved before permits are issued (agenda and meeting summary)
2. Administer D-B Design	<ul style="list-style-type: none"> • None
3. Administer D-B Construction	<ul style="list-style-type: none"> • None
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

Table B16.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Informal kickoff meeting • Formal partnering
2. Administer D-B Design	<ul style="list-style-type: none"> • 3rd-Party Design Reviews
3. Administer D-B Construction	<ul style="list-style-type: none"> • None
4. Administer D-B Closeout	<ul style="list-style-type: none"> • Contractor Past Performance Rating (same as D-B-B)

Case Study 17. SR 90 Traffic Signal ITS (D-B), Florida

Project Name: SR 90-US 41-SW 8 Street Adaptive Signal Control Technology Pilot Project

Name of Agency: Florida Department of

Location: Miami-Dade County, Florida

Project Delivery Method–Procurement–Contract Type: D-B–Low Bid–Lump Sum

Total Project Cost: \$3.8 million

Construction Schedule: February 15, 2016–June 30, 2017

Project Description: This project required the deployment of an InSync Fusion-type model adaptive signal control technology system throughout 29 intersections on SR 90, US 41, and SW 8 Street. The D-B team was responsible for the design, installation, integration, testing, documentation, training, and warranty services for the project. This newly installed system allow for real-time traffic monitoring as opposed to pre-timed signals. The existing signals were left in place, and new cameras were added to the existing structures. A summary of the initial tools for the investigation is shown in Table B17.1.

Table B17.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Informal kickoff meeting • Formal Partnering
2. Administer D-B Design	<ul style="list-style-type: none"> • 3rd-Party Design Reviews • Design Reviews roles and responsibilities
3. Administer D-B Construction	<ul style="list-style-type: none"> • Internal Signal Inspectors came to project at 60%, 90%, and 100%
4. Administer D-B Closeout	<ul style="list-style-type: none"> • Contractor Past Performance Rating (same as D-B-B)

Table B15.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> Internal D-B Training (not project specific) Informal partnering Roles and responsibilities outlined in RFP (could use more detail in the team's opinion)
2. Administer D-B Design	<ul style="list-style-type: none"> Over-the-shoulder reviews Internal Technical Reviews Project website used for all documentation
3. Administer D-B Construction	<ul style="list-style-type: none"> Incentives for Superior Quality (HMA and longitudinal joint density) outlined in RFP
4. Administer D-B Closeout	<ul style="list-style-type: none"> All similar to D-B-B

Case Study 16. I-75 (SR 93A) ITS (D-B), Florida

Project Name: I-75 (SR 93A) from north of I-275 to Manatee–Hillsborough County Line

Name of Agency: Florida Department of Transportation

Location: Manatee and Hillsborough County, Florida

Project Delivery Method–Procurement–Contract Type: D-B–Low Bid–Lump Sum

Total Project Cost: \$2.9 million

Construction Schedule: January 2017–April 2018

Project Description: This project included ITS Freeway Management for Tampa Bay Sun-Guide on I-75 (SR 93A) from the existing communication hub north of the I-275 Interchange to the Manatee–Hillsborough County Line in Manatee County. The project covered a length of 5.32 miles. Work included the design and installation of an underground conduit, message boards, and poles with cameras for live traffic feeds (Figure B16.1). A summary of the initial tools for the investigation is shown in Table B16.1.

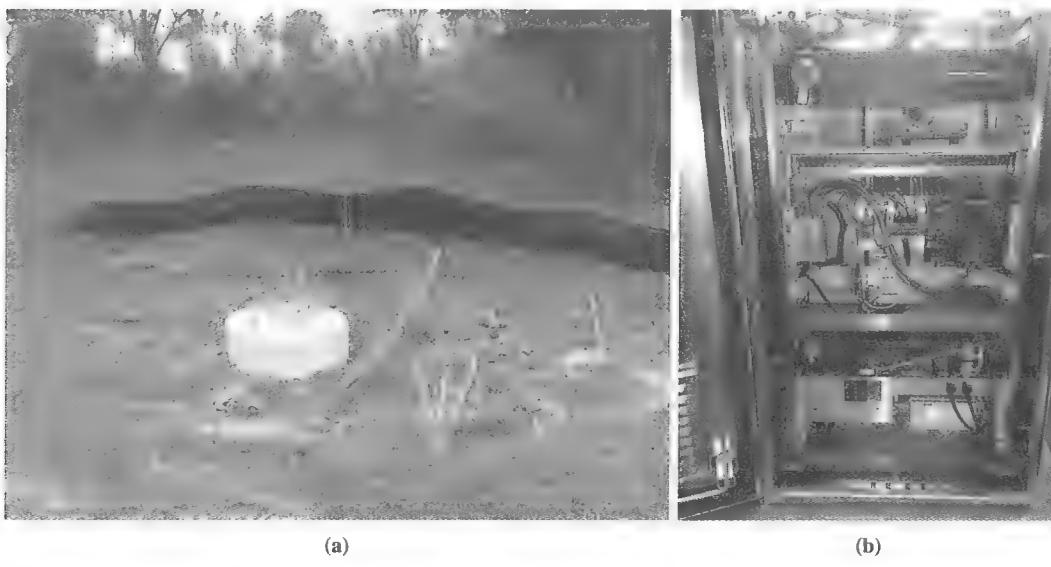


Figure B16.1. The I-75 (SR 93A) ITS Project included (a) installation of an underground conduit and pole foundation and (b) ITS cabinet (Source: Florida Department of Transportation).

Case Study 15. US-2-US-41 Iron Mountain Road Rehabilitation (D-B), Michigan

Project Name: Reconstruction of US-2-US-41 at M-95 North Junction

Name of Agency: Michigan Department of Transportation

Location: Breitung Township, Dickinson County, Michigan (Upper Peninsula)

Project Delivery Method—Procurement—Contract Type: D-B—Low Bid—Lump Sum

Total Project Cost: \$1.9 million

Construction Schedule: March 2017—September 2017

Project Description: This project was located in Breitung Township, Dickinson County, on US-2-US-141 at M-95. The project included reconstruction of the existing four-lane boulevard section and realignment—geometric configuration to a five-lane section along US-2-US-141 (Figure B15.1). One of the project goals was to reduce rollover potential through geometric improvements in cross slope, grade breaks, horizontal alignments, and vertical profiles. The project consisted of road rehabilitation, including concrete pavement repairs and hot mix asphalt, cold milling, and resurfacing. A summary of the initial tools for the investigation is shown in Table B15.1.

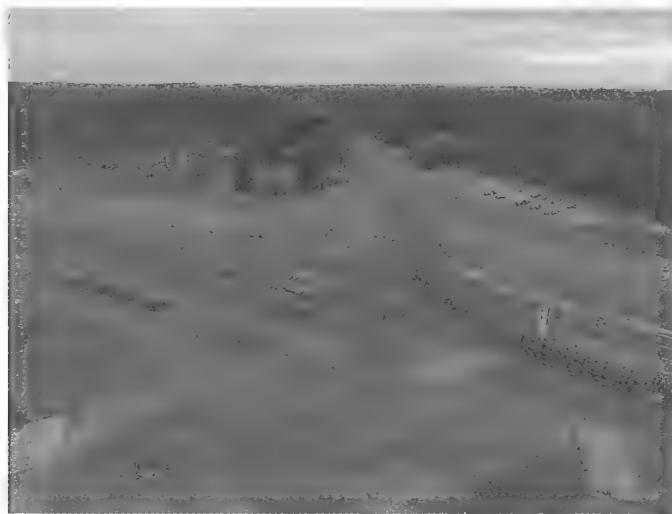


Figure B15.1. US-2-US-41 Iron Mountain Road rehabilitation (Source: Michigan Department of Transportation).

and accommodates one lane of traffic in each direction. The proposed bridge will have the same number of lanes but will be widened to meet current SHTO and Georgia DOT requirements. All approach work to accommodate the bridge widening will be limited to SR 299 between the I-24 ramp terminals. No additional right-of-way or easement will be required for the removal of the existing bridge or the construction of the new bridge. A summary of the initial tools for the investigation is shown in Table B14.1.



Figure B14.1. SR-299 Bridge over I-24
(Source: Georgia Department of Transportation).

Table B14.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> Role and Responsibilities definitions in the D-B Manual Kickoff meetings for preliminary design, final design, and a design workshop One-on-one meetings for ATCs Stipend provided for unsuccessful proposers who have ATCs Georgia DOT would like to purchase
2. Administer D-B Design	<ul style="list-style-type: none"> Monthly design meetings “Huddle Up” Meetings between monthly meetings E-Builder used to store all design reviews and project documents
3. Administer D-B Construction	<ul style="list-style-type: none"> 3rd party CEI hired by Georgia DOT Biweekly project update meetings Public meetings prior to SR-299 closure, flyer provided to public Live feed of construction during closure available to the public
4. Administer D-B Closeout	<ul style="list-style-type: none"> D-B post construction evaluation/lessons learned (completed by Georgia DOT and D-B team)

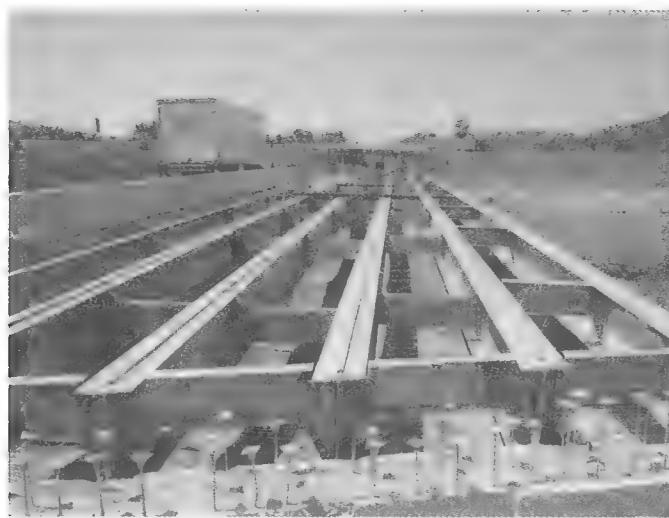


Figure B13.1. West 4th Street Bridge
(Source: Pennsylvania Department of Transportation).

Table B13.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B and DOT	<ul style="list-style-type: none"> ACM roles and responsibilities (in contract)
2. Administer D-B Design	<ul style="list-style-type: none"> Pennsylvania Project Collaboration Center (PPCC) is in-house software that organizes all project documents into a standard folder organization, automatically routes documents to DOT reviewers, and tracks reviews. Submission requirement/review times (in contract, section VII, table) Overview of FHWA involvement on ACM projects (Innovative Bidding Toolkit, App. B - Submittal Review Responsibility Checklist, p.190)
3. Administer D-B Construction	<ul style="list-style-type: none"> Innovative Bidding Toolkit
4. Administer D-B Closeout	<ul style="list-style-type: none"> Contractor Performance Evaluation Form and weighting system

Case Study 14. SR-299 Bridge over I-24 (D-B), Georgia

Project Name: SR-299 at I-24 Bridge Replacement

Name of Agency: Georgia Department of Transportation

Location: Dade County, Georgia, SR-299 over I-24

Project Delivery Method–Procurement–Contract Type: D-B–Best Value–Lump Sum

Total Project Cost: \$7.2 million (\$1 million design and \$6.2 million construction)

Construction Schedule: December 2015–June 2017

Project Description: The project covers approximately 0.16 miles along SR 299. Existing SR 299 right-of-way is slightly variable, ranging from 200 ft. on the west side of I-24 to 255 ft. on the east side of I-24 (Figure B14.1). The existing bridge is approximately 34.5 ft. wide and 240 ft. long

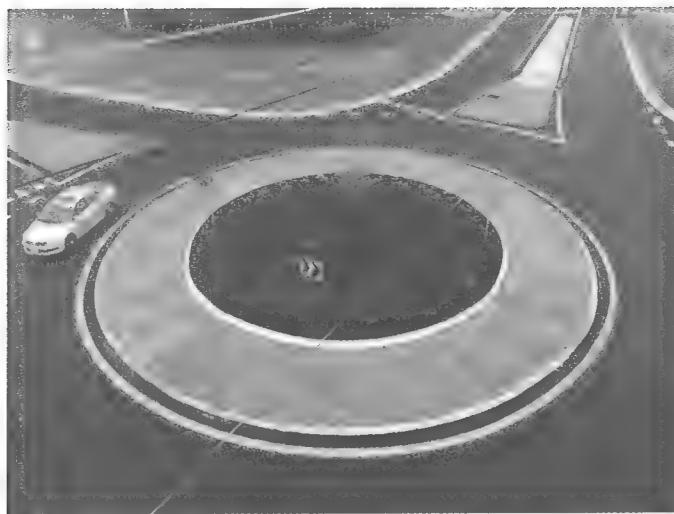


Figure B12.1. Braddock Road–Pleasant Valley Roundabout (Source: Virginia Department of Transportation).

Table B12.1. Summary of initial tools for investigation.

Agency Activities	Initial Tools
1. Administer Alignment between D-B Team and DOT	<ul style="list-style-type: none"> • Kickoff meeting • Scope Validation Period • Continuity of team members
2. Administer D-B Design	<ul style="list-style-type: none"> • Comment Resolution Meetings (in-progress design) • Design QC Checklist (Alternative Plan Standards)
3. Administer D-B Construction	<ul style="list-style-type: none"> • ACM hold points
4. Administer D-B Closeout	<ul style="list-style-type: none"> • None

Case Study 13. West 4th Street Bridge (D-B), Pennsylvania

Project Name: West 4th Street Bridge

Name of Agency: Pennsylvania Department of Transportation

Location: Williamsport, Pennsylvania

Project Delivery Method–Procurement–Contract Type: D-B–Low Bid–Lump Sum

Total Project Cost: \$3.39 million

Construction Schedule: Spring 2016–August 2017

Project Description: The project removed and reconstructed an 8 in. concrete bridge deck with epoxy overlay of a 413-feet five-span steel girder bridge (Figure B13.1). The bridge had three lanes and a sidewalk on both sides. Steel beams and concrete piers were repaired as needed, and the steel structure was painted. The D-B team consisted of CBM Smith and Susquehanna Valley Construction Corp. A summary of the initial tools for the investigation is shown in Table B13.1.

fatal flaws within a given discipline or between disciplines. The contents of the Preliminary Design Submittal for each discipline shall be as specified in these Technical Requirements and as mutually agreed upon by members of the applicable task force, or by agreement between WSDOT and the Design-Builder if no specific task force applies.

2.28.3.4.3 Final Design Submittal

The Final Design Submittal shall be prepared when the design for a given element or area is 100 percent complete. The Final Design Submittal shall include plan sheets, specifications, technical memos, reports, calculations, and other pertinent data, as applicable. As a result of the on-going discussion and resolution of design and construction issues through the regularly-scheduled task force meetings and over-the-shoulder reviews, it is anticipated that there will be very few revisions or changes at this stage.

The Final Design Submittal shall include all specifications, including but not limited to, all Amendments to the WSDOT Standard Specifications, Special Provisions, Technical Requirements, and Technical Specifications, necessary to construct the Work represented in the submittal. Following resolution of all comments, the Final Design Submittal may proceed through the written certification process described below in preparation for being Released for Construction.

2.28.3.4.4 Released for Construction (RFC) Documents

The QMP shall describe how the Design-Builder will ensure that the RFC Documents reflect all QA, QC, and design reviews required by the QMP and the Contract. The QMP shall also describe the written certification process to be used to verify to WSDOT that all QA procedures have been completed to ensure that all review comments have been incorporated as agreed to during the comment resolution process among WSDOT, any affected municipalities, and the Design-Builder, and that the documents are ready to be Released for Construction.

Each sheet of the plan set and the cover of each set of Technical Specifications in the RFC Documents shall carry the Professional Engineer's stamp and signature and shall be stamped "Released For Construction" by the Design QA Manager. The cover of the WSDOT Amendments to the WSDOT Standard Specifications does not need to carry a Professional Engineer's stamp.

Once plans and Technical Specifications have been Released for Construction, the Design-Builder shall provide WSDOT with six hard copies and electronic files (in both MicroStation and PDF formats) on CDROM of all RFC Documents. The electronic drawing files shall include copies of all sheet and reference files used in the RFC Documents.

Prior to submittal, electronic files for all RFC Documents, except the MOT Plans, shall be checked by the Design-Builder to ensure that they conform to the WSDOT Plans Preparation Manual file naming and drawing symbology (e.g., level contents, and line and text symbology). The drawing symbology and file naming for each electronic drawing file shall meet or exceed a minimum conformance level of 90 percent, and the average conformance level for all drawing files shall be 95 percent or greater. MOT Plans are not required to meet the conformance level criteria. The Design-Builder shall provide WSDOT with a Microsoft Excel (version 2007) spreadsheet for each RFC Submittal containing the file name and the corresponding conformance level for every file that is part of the submittal. WSDOT will provide a template that shall be used for this task. Certain files provided to the Design-Builder by WSDOT, such as base mapping or vicinity maps,

may be excluded from the conformance-level requirement. The Design-Builder shall obtain written confirmation from WSDOT as to which files are exempt from compliance with the WSDOT Plans Preparation Manual.

Construction shall not proceed on any element of Work until the relevant submittal is stamped “Released for Construction” by the Design QA Manager, and all required government and private approvals have been obtained by the Design-Builder.

Clause Code:	012-DSRA-02
Clause Type:	Design Submittal, Review & Approval
Project Name:	Ambassador Bridge Plaza – Gateway Completion
Owner Name:	Michigan DOT
Year Published:	2012

PROJECT REQUIREMENTS BOOK 2

2 PROJECT MANAGEMENT

This Project will be managed with a document control Web site (<https://mdot-dbf.com/MDOTGateway/>). All Project deliverables and submittals shall be submitted in electronic format to a secure Project Web site, unless otherwise noted. The Contractor is not responsible for providing a Project Web site. If a submittal is too large to submit to the Project Web site or is submitted to MDOT by other means other than the Project Web site, the Contractor shall submit a cover letter for this submittal to the Project Web site providing submittal information and how the submittal will be submitted to MDOT.

The Contractor shall be prepared to work within the parameters of the Project Web site to receive Project information notifications via e-mail and download Project information from the Project Web site. The Contractor shall submit a MDOT Project Web site User Log-In Request form (See Exhibit 2-2-A) for personnel the Contractor would like to have access to the Project Web site. MDOT reserves the right to limit security levels. The Contractor is responsible for information provided to MDOT by the Contractor's personnel via the Project Web site.

Deliverables submitted to the Project Web site shall be in Adobe Acrobat (PDF) format, version 8.0 or a version compatible with version 8.0, unless noted otherwise.

<Omitted>

2.1.5 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. Acceptable electronic formats include Microsoft Word, Microsoft Excel, or Adobe Acrobat (.PDF) files, unless otherwise indicated. Drawings shall be submitted electronically in original MicroStation format and in Adobe Acrobat (.PDF). At a minimum, the Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies	Submittal Schedule	Reference Section
		Hardcopy	Electronic	
Draft Meeting Minutes	Review	0	1 (PDF)	Within five days of the meeting
Final Meeting Minutes	Acceptance	0	1 (PDF)	Within five Days of receiving MDOT comments
MDOT Project Web site User Log-in Request	Approval	0	1	At or prior to Preconstruction Meeting

<Omitted>

2.4 Quality Management

2.4.1 Responsibilities

Contractor Responsibility: The Contractor shall be responsible for providing all administration, design, and construction Work in accordance with the Contract Documents. The Contractor shall not be relieved of its obligation to perform the Work in accordance with the Contract Documents, or any of its other obligations under the Contract Documents, by oversight, spot checks, audits, reviews, tests, inspections, acceptances, or approvals by any Persons, or by any failure of any Person to take such action.

The Contractor shall be responsible for providing and following a Design Quality Manual (DQM) in accordance with this Section 2.4.

MDOT Role: MDOT will review design submittals as described in this Section 2. During construction, MDOT will perform construction engineering, testing, and inspection duties similar to the standard approach used on traditional MDOT design-bid-build projects.

<Omitted>

2.4.5 Design Deliverables and Review

The following items shall be submitted to MDOT:

- Released for Construction Documents
- Shop and working drawings
- Product Data
- As-Built Documents

Plan content requirements can be waived if the Project does not have that specific item.

All design deliverables or submittals shall include the following to communicate the state of the item:

- Cover or transmittal letter stating what is in the package
- Letter or documentation stating the Contractor's quality program was following and certifying the following:
 1. The design meets all applicable requirements of the Contract Documents, applicable law, and the governmental approvals.
 2. The design has been checked in accordance with the Contractor's Approved DQM.
- Any additional plan submittal information as it relates to completeness and its suitability for review
- Plans shall have an open area that measures 1 inch by 2 inch above the title block of each plan sheet. Special provisions or other 8.5 inch by 11 inch media shall have an open area in the header, footer, or outside margin. This open area shall be in the same location on all sheets in a submittal. Open area will be used by MDOT to place acceptance or approval stamps.

<Omitted>

2.4.5.5 Over-The-Shoulder Review Meetings

The Contractor shall schedule and facilitate Over-The-Shoulder (OTS) review meetings with MDOT at least once weekly, or as required by MDOT. The intent of the OTS meetings is to provide a

continuous interface between the Contractor and MDOT to resolve Project items as soon as possible in an effort to reduce the number of resubmittals and review times. For OTS meetings the Contractor shall:

- Prior to the meeting, provide the MDOT PM an agenda for the meeting outlining topics they would like to discuss and any materials (handouts, drawings, RFC Documents, etc.) required to facilitate the meeting.
- Provide a meeting location or agree with MDOT on the location of the meeting.
- Schedule the meeting to fit best with its operations and submittal schedule.
- Have relevant staff present at the meeting in an effort to make effective and efficient decisions.
- Run or facilitate the meeting and keep the meeting under 2 hours in duration.

Upon receipt of the meeting agenda and discussion topics, MDOT will request the proper personnel attend the meeting to make effective and efficient decisions.

2.4.5.6 MDOT Design Review

The Contractor shall submit all design calculations for MDOT review with Released for Construction Documents and obtain MDOT's signature on all Released for Construction Documents prior to release of those documents for construction.

MDOT Review Procedures

MDOT will review as many design packages as it can within the limitations of its staff; however, at MDOT's sole discretion, it may limit the number of over-the-shoulder review meetings, in-progress submittals, design submittals, and design re-submittals in a given week.

After each review, the Contractor shall address all comments and concerns raised by MDOT by revising the design and/or plans to MDOT's satisfaction prior to resubmittal.

In-Progress Submittal Reviews

In-Progress Submittal reviews are informal examinations by MDOT of design documents during the Project design process. The reviews may, at MDOT's discretion, include review of design drawings, electronic files, calculations, reports, specifications, geotechnical data, progress prints, computer images, draft documents, draft specifications and reports, other design documents, and any other relevant design information as requested by MDOT.

It is the intent of these reviews to check for concept, level of detail, design criteria, and fatal flaws. It is the Contractor's responsibility to confirm conformance with the Contract requirements. These reviews will not routinely include detailed calculation or drawing reviews, although MDOT retains the right to perform detailed reviews of any item at any time.

The In-Progress Submittal reviews are not critical activity points that restrict the progress of design. They are simply reviews of the design as it progresses and provides opportunities for MDOT to offer comments and feedback on the design. MDOT reserves the right to request In-Progress Submittals be submitted or to schedule In-Progress Submittal review meetings during the course of design package development, prior to issuance of Released for Construction Documents.

MDOT Review Time Requirements

MDOT will complete its review of the Contractor's plans and submittals within five Working Days, unless otherwise indicated elsewhere in these Contract Documents. Deliverables or submittals received after 3:30 p.m. Eastern Time will be considered as being received by MDOT the next Working Day. This review time depicts the maximum allowed time MDOT has to review the associated submittals.

and respond to the Contractor without impacting the overall Project schedule. Each design package may go through multiple iterations of review by MDOT before Acceptance. Each time a package is submitted, the timelines above will be the maximum amount of time allotted for MDOT to complete its review. The actual MDOT review timeline may be directly related to the extent of involvement the Contractor allows MDOT during the design development process by consistently engaging MDOT. More up-front MDOT involvement may shorten review timelines.

Design Submittals

Re-submittal Process

Re-submittals of Design Documents may be required if deemed necessary by the Contractor's Design Quality Assurance staff or MDOT. Each re-submittal must address all comments received from a prior submittal in a manner satisfactory to the commenting party. A resolution of comments stating how the Contractor addressed MDOT's comments shall be included in the re-submitted package. The Contractor shall not be entitled to any additional compensation or time extension due to any re-submittal requirement by the review process or MDOT.

The Contractor shall resubmit the Design Document (as well as any other required design re-submittal) as many times as necessary to address the comments of the quality process and MDOT.

The Contractor may continue its design activities, at its sole risk, during the re-submittal process. Such continuation in no way relieves the Contractor of the responsibility to incorporate the comments of the resubmittal process into the Design Documents.

Released-for-Construction Submittals

The Contractor shall submit the Released for Construction (RFC) Documents to designer Quality Assurance staff for review and approval prior to submittal to MDOT. RFC Documents are intended to allow construction to begin on segments or elements of the Project as the design progresses and before final design is complete.

When the Contractor has completed the RFC Documents and wishes to submit a RFC Document of an item or element to obtain MDOT's Acceptance, the designer's Quality Assurance staff shall certify in a letter or from that:

- The design meets all applicable requirements of the Contract Documents, applicable law, and the governmental approvals.
- The design has been checked in accordance with the Contractor's approved DQM.
- The item or element is ready for construction.
- All required ROW has been secured, along with any and all approvals from governmental agencies, and Utility owners.
- All comments from MDOT and other reviewing agencies from previous submittals are resolved.

After certifying the above items, the Contractor may submit the RFC Document for said item or element.

The Contractor shall incorporate comments from the In-Progress Submittal reviews, and/or submittal reviews into its design and resolve all concerns and questions to the satisfaction of MDOT. The Contractor shall then submit to MDOT the RFC Package.

If MDOT determines that the RFC Package does not meet the requirements of the Contract Documents, applicable law, and the governmental approvals, MDOT will notify the Contractor in

writing of any specific deficiencies in the RFC Package. The Contractor shall resolve and document resolution of comments.

The Contractor may proceed with construction of certain elements or portions of the Project in accordance with Released-for-Construction plans before the design of the entire Project has been completed at the Contractor's sole risk.

Design Changes

Either the Contractor or MDOT may initiate design changes for items or elements undergoing construction or after Final Design.

All design changes shall undergo the same design quality procedures specified in the DQM for the original design, and must be documented and approved by the engineer who signed the original design document. If this engineer is no longer available, then after notifying the original engineer and gaining MDOT's Acceptance, a Michigan-licensed Professional Engineer of equal or greater experience than the original engineer shall document and approve each design change.

For each design change, Design Quality Assurance shall certify in writing that the design change has been:

- Designed in accordance with the requirements of the Contract Documents, applicable law, and the governmental approvals
- Checked in accordance with the Contractor's Approved DQM
- Prepared consistently with other elements of the original design

The Contractor shall also document all changes made through the design change process in the As-Built Documents.

Refer also to:

2.4.5.2 Shop and Working Drawings

2.4.5.4 As-Built Documents

2.4.5.7 Document and Data Control

2.4.5.9 Deliverables

Clause Code:	013-DSRA-03
Clause Type:	Design Submittal, Review & Approval
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

Section 121 – DESIGN SUBMITTALS AND REVIEWS

Description

121.01. Philosophy and Intent. All reviews will be conducted to assess conformance with the contract requirements. Technical issues, such as computations, will generally not be checked by Government, but will be considered part of the Contractor's design QA/QC responsibilities.

The processes described below apply to submittals requested for Division 111 requirements. Submittal and review processes for all other Divisions are described in the Section that the submittal is requested.

The submittal and review process is broken into four primary components:

- Project Segment Submittals;
- Specific Element Submittals;
- Over-the-Shoulder Reviews; and
- Early Construction Submittals. The Contractor is responsible for all errors, omissions, and rework associated with the design.

Requirements

121.02. General. If a design submittal is determined to be in non-conformance with the contract requirements the submittal will be returned to the Contractor with deficiencies noted. Contractor shall resubmit the package after revisions have been made. Each resubmittal must address all of the comments received from a prior submittal. No compensation will be made for schedule impacts, including shipping and review times, caused by the Contractor's non-compliance with the contract requirements.

The Contractor may continue the design efforts, at the Contractor's sole risk, while design submittals are being reviewed. Doing so, in no way relieves the Contractor of the responsibility to incorporate review comments into the design, nor does it entitle the Contractor to any additional compensation or time extension resulting from changes due to review comments.

The Contractor is required to submit a project submittal schedule at the Preconstruction Conference and provide an updated copy weekly to the CO. Send three (3) complete hard copies and one electronic copy of all design submittals to the onsite Project Engineer. Location and addresses will be provided to the contractor at the Pre Construction Conference.

Submittals not shown on the Submittal Schedule submitted in accordance with Section 155, may not be accepted.

The cover sheet of each plan submission shall bear the seal and signature of a professional engineer licensed in the state of Hawaii.

Drawing dimensions shall be in customary U.S. units. Plan sheet scales shall be chosen such that all work is clearly detailed and defined, without an excessive amount of clutter. In addition to the specific requirements of each submittal, provide the following:

- a) sufficient technical information and drawings to assess conformance with the contract requirements,
- b) construction specifications for work items not addressed in construction requirements elsewhere in the contract,
- c) design exception requests (if any),
- d) certification that established Design QA/QC procedures have been implemented and that the work conforms to said procedures, and
- e) a list of CFLHD and Contractor work items used to control the work.

In addition to the specific requirements of each submittal, provide the following for each site:

- (a) **Quantity Computations** provide quantities supporting the proposed design. All quantity computations shall conform to the *Master CFLHD Pay Item List*.
- (b) **Specifications** for work items not addressed in the construction requirements elsewhere in the contract.
- (c) **Sufficient technical information** and drawings to assess conformance with the contract requirements.
- (d) **Certification** that established Design QA/QC procedures have been implemented and that the work conforms to said procedures.
- (e) **Memorandum** from the Construction Superintendent that he/she has reviewed and has concurred with the submittals.

Items of Work

The work shall consist of furnishing all design and construction activities, including, but not limited to, plans, documentation, equipment, materials, labor, and incidentals necessary to successfully complete the project in compliance with this RFP. The Offeror shall perform, as a minimum, the primary items of work listed herein. This list is not all-inclusive, and the Offeror shall be responsible for identifying all items of work and constructing them.

Primary Design Work Items

1. Survey
2. Traffic analysis for signalization, if needed
3. Roadway geometric design
4. Concrete pavement design and material recommendations
5. Geotechnical investigation and design
6. Hydraulic design, including obtaining hydraulic information, as well as other hydraulic features such as: inlet and outlet protection, headwalls, end sections, etc.
7. If needed, design of temporary crossings including their approaches

8. Design of the proposed structures.
9. Quality management program and implementation
10. Structures design documentation (Design calculations, load rating calculations, record drawings and as-built plans)
11. Permit applications preparation, submittal, and closeout
12. Traffic control plans
13. Construction staging planning
14. Permanent Traffic Control
15. Turf establishment and erosion control plan (including cofferdams or stream diversion berms)
16. Permanent BMP design
17. Environmental compliance and monitoring
18. Utility design and agreements
19. As-built plan preparation and production

Primary Construction Work Items

1. Survey
2. Clearing and grubbing
3. Grading
4. Maintenance of traffic (including construction of the temporary crossings and approaches, if needed)
5. Construction of a non-reinforced jointed plain concrete pavement and construction of base course
6. Construction of Punakea Loop extension crossing/underpass and three additional major drainage crossings along with scour protection at the drainages
7. Permanent Seeding, mulching, and erosion control including cofferdams or diversion berms
8. Material testing
9. Quality management
10. Permanent Signing and striping
11. Project coordination with the Army Corps of Engineers, local agencies, and the public
12. Construction staging and phasing as necessary
13. Project administration, management, and scheduling
14. Environmental Compliance; mitigation, monitoring, and reporting
15. All other incidental items needed to complete the project
16. Some items of work, such as traffic control, may extend beyond these limits. All such items are integral to this contract as described in the RFP.
17. Public Information Plan; development and maintenance
18. Traffic signalization, as required
19. Permanent lighting
20. Utilities, as required

121.03. Overall Project Submittals. Furnish two required design submittals for each proposed release for construction as indicated below:

(1) Intermediate Design Submittal. The purpose of this submittal is to ascertain that the design is progressing in accordance with the requirements of the project, that

existing field conditions have been properly identified and dealt with, that coordination within the design disciplines and elements of the project is evident, and that liaison and coordination has occurred between the Contractor, the Government, and related agencies.

Provide detailed construction drawings, additional specifications, and supporting reports and calculations. Incorporate all comments made on the Initial Submittal, any Specific Element Submittals, and/or any Over-the-Shoulder reviews, and include the following information:

- Cover Sheet
- Location Map
- Typical Sections
- Summaries and Schedules
- Construction Plans
- Structures Plans
- Traffic Control Plans
- Erosion Control Plans
- Utility Plans
- Special project-specific details
- Standard Plans and Drawings, including HDOT and CFLHD standard drawings
- Structure Selection Report and Type, Size and Location Drawings showing opening width, and Q50 water surface elevation.
- Geotechnical/Pavement/Materials Reports including foundation recommendations and concrete pavement recommendations and associated design elements.
- Hydrology and Drainage Report
 - o Provide a draft Drainage Report in accordance with the guidelines shown in the State DOT Design Criteria for Highway Drainage.
 - o Bridge freeboard analysis and recommended low chord elevation
 - o Bottomless culvert headwater analysis and recommendations
 - o Analysis and recommendations for temporary crossings and/or diversion berms
 - o Abutment scour analysis and abutment scour countermeasure recommendations for the selected alternative at drainage structures
 - o Roadway drainage design and recommendations, including storm water management or other drainage design in support of environmental permitting
- Provide a draft Drainage Report in accordance with the guidelines shown in the State DOT Design Criteria for Highway Drainage.

The Government turn-around time for the Intermediate Design Submittals is 7 calendar days, from the day the submittal is received to the day it is sent back to the Contractor. Although the Government will be providing comments after this submittal, it is ultimately the Contractor's responsibility to coordinate with the permitting agencies to ensure all design and construction requirements are included (see Subsection 107).

(2) Final Design Submittal. Provide detailed, 100 percent complete and checked drawings, reports and specifications necessary for the construction of the project.

Provide all signed and sealed original project design documents including plans, reports, and additional specifications, in accordance with the requirements of the Contract. Include the following:

- Completed Contract Plans and Specifications.
- Copies of all required permits.
- LRFR load rating calculations based on the as-builts conforming to AASHTO Manual for Bridge Evaluation. Load rate each structure using the BRASSGIRDER LRFD software.
- Provide calculations, notes, and assumptions necessary to complete the load rating.
- Provide BRASS input data files.
- Complete the HDOT Load Rating form and summarize the findings.
- Final Geotechnical/Pavement/Material Reports including foundation recommendations and concrete pavement recommendations and associated design elements.
- Final Hydrology and Drainage Reports and HECRAS v.4, 0 software files.
- Final Design Compliance with Environmental and Aesthetic Treatments.
- Final Permanent BMP Report.

The Government will respond to Final Design Submittals in 7 calendar days from the day a complete and compliant submittal is received to the day related construction would be authorized to proceed. The Government will review no more than 3 submittals at a time.

(3) Release For Construction (RFC) Submittal. Provide detailed, 100 percent complete and checked drawings that address the comments received from the Government during the Final Design Submittal Review, plus the requirements listed in Subsection 121.02. Include the following:

- Completed Contract Plans and Specifications
- Copies of all required permits
- Design Calculations

Construction may begin on any approved Final Design Submittal that is released for construction.

Written documents to be provided to FHWA related to this project will be delivered in electronic and hard copies. Documents will be provided in the following software formats unless specifically amended otherwise by the COTR in writing:

<u>Application</u>	<u>Software</u>
Word Processing	Microsoft Word
Spreadsheet	Microsoft Excel
CADD	MicroStation
Highway Design	Geopak

121.04. Early Construction. Early construction may begin on any approved Specific Element Submittal at the sole risk of the Contractor. Work may not start prior to approval by the CO. The extent, acceptability, and schedule for early construction reviews will be mutually agreed

at the Preconstruction Conference based on information contained in the Baseline Schedule and its approval.

If Contractor elects to do work prior to release for construction by the CO it will be at the risks of the contractor.

121.05. Specific Element Submittals. Specific element submittals may be requested by the Contractor to assist in obtaining general approval of conformance with the contract and commencing with early construction activities.

121.06. Over-the-Shoulder Reviews. Over-the-Shoulder reviews may be scheduled by the Contractor or CFLHD. Over-the-Shoulder reviews are strongly encouraged to enhance the partnering efforts between the Contractor and the Government. Reviews will be held at a location approved by the CO. Requests for reviews, by either party, shall be made in writing and shall allow at least seven calendar days' notice prior to the proposed review. The number and timing of the reviews will be discussed at the Start-up Conference.

Over-the-Shoulder reviews will be conducted for informal review of designs. The intent of Over-the-Shoulder reviews is to provide guidance to the Contractor during the course of the project. Over-the-Shoulder reviews do not take the place of the Overall Project Submittals.

121.07. Review Scheduling. Provide written notification two weeks prior to each formal design submission. Show and update each notification and submission on the Project Schedule required in Section 155.

121.08. Changes to Final Designs. The Contractor may initiate design changes at any time during the process.

(a) Design Changes Prior to Final Design Submission. If the proposed design change occurs after a scheduled intermediate review, notify the CO in writing. In the notification, provide the following regarding the change: a general overview, reasons and justifications, and schedule impacts. Incorporate the change into the Final Submittal after receiving written approval from the CO.

(b) Design Changes After Final Design Submission. If the proposed design change occurs after a final design submission, submit a revised final design submittal for the affected segment of the project. Conform with the technical requirements specified for that submittal type. In addition, provide the following regarding the change: a general overview, reasons and justifications, and schedule impacts.

The Government will respond to Final Design Submittals in 7 calendar days from the day a complete and compliant submittal is received to the day related construction would be authorized to proceed. The Government will review no more than 3 submittals at a time.

121.09. As-Built Records. As constructed plans of the completed construction project are needed to provide a historic record of all work accomplished on this route. These plans are

used as future references for needed repairs, maintenance, and rehabilitation projects. See Section 104 for As-built working drawing requirements.

Maintain one record copy of all design documentation at the site, in good order and regularly noted to show all changes made during construction. Make these documents, along with all other submittals made by the Contractor, available to the CO during construction.

After substantial completion of the project but before final completion, submit one full-size original set of as-built drawings to the CO. Use the *Federal Lands Highway Project Development and Design Manual, Chapter 9* as a reference for preparing as-built plans.

Clause Code:	014-EOR-01
Clause Type:	Engineer of Record
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

CONTRACT DOCUMENTS PART 2 DB SECTION 101 GENERAL PROVISIONS

DB SECTION 101 ABBREVIATIONS, SYMBOLS, AND TERMS AND DEFINITIONS

DB 101-3 CAPITALIZED TERMS

The following capitalized terms shall have the following meanings:

<Omitted>

Responsible Engineer – The New York-licensed engineer, designated by the Designer for each Design-Builder-designated Design Unit who is responsible for signing and sealing design reports, Design Plans, Working Plans and Project Specifications for the assigned Design Unit(s).

<Omitted>

DB 111-2.4 Responsible Engineer

The Designer shall designate and assign a Responsible Engineer for each Design-Builder designated Design Unit. The Responsible Engineer(s) shall sign and seal design reports, Design and Work Plans, and Project Specifications for the assigned Design Unit(s). Responsible Engineers shall be New York-licensed Professional Engineers.

The Responsible Engineer shall attend all Design Reviews for the assigned Design Unit(s). *See DB §101 for the definition of Responsible Engineer.*

Refer also to:

DB 111-3 DESIGN UNITS

DB 111-12.2 Release for Construction

DB 111-19.1 Plans

DB 113-2.3.8 Design Changes

Clause Code:	015-EOR-02
Clause Type:	Engineer of Record
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

III. CONTRACT TERMS AND CONDITIONS

<Omitted>

Designer of Record

The Contractor shall designate the Designer of Record (DOR) for this project. The DOR shall be a registered, licensed, Professional Engineer in the State of Hawaii and shall meet the requirements of contract clause 52.236-25 "Requirements for Registration of Designers". The DOR is responsible for the following:

- (a) The DOR serves as the single point of responsibility for all design decisions.
- (b) The DOR shall review, certify, sign and seal all final construction drawings, specifications, record drawings and other appropriate design documents.
- (c) The DOR shall certify, sign, and seal all final proposed design changes, NCRs and Repairs.
- (d) The DOR shall certify, sign and seal that all construction completed and conforms to the final design submittals.
- (e) Professional Engineers in responsible charge of specific design elements shall sign and seal their specific design elements. The Designer of Record shall review, coordinate, de-conflict and approve for construction all design and extensions of design produced by all members of the DB Contractor's team including design sub-consultants, material suppliers and other entities as required.
- (f) The DOR shall conduct and document regular jobsite quality assurance inspections and verify that the contractor's quality control system and construction quality conforms to the record drawings and specifications.
- (g) The DOR shall provide Professional Liability insurance for the project (refer to Subsection 107.05).

Clause Code:	016-DSC-01
Clause Type:	Differing Site Condition
Project Name:	Ambassador Bridge Plaza – Gateway Completion
Owner Name:	Michigan DOT
Year Published:	2012

Design-Build Contract BOOK 1

5 CONTROL OF WORK

<Omitted>

5.3 Process to be Followed for Discovery of Certain Site Conditions

5.3.1 Discovery of Certain Site Conditions

If Contractor becomes aware of (a) any on-Site material that Contractor believes may contain Contaminated Materials requiring removal or treatment, (b) any paleontological, cultural or biological resources, or (c) any Differing Site Conditions, Contractor shall immediately notify MDOT via telephone or in person, to be followed immediately by written notification. In such event, Contractor shall immediately stop Work in the affected area and secure the affected area pending receipt of direction from MDOT. A provision of said notice by Contractor constitutes a condition precedent to MDOT's consideration of a Change Order with respect to the conditions in question.

5.3.2 Further Investigation & Remediation Work

MDOT will view the location within one Working Day of receipt of notification from Contractor and may advise Contractor at that time whether to resume Work or whether further investigation is required. Contractor shall promptly conduct such further investigation as MDOT deems appropriate. Within one Working Day after viewing the locations, MDOT will advise the Contractor of the recommended action plan regarding the situation. Any delay in prosecution of the Work due to suspension of Work during the two Working Day period following MDOT's receipt of notification from Contractor shall not be considered a MDOT-Caused Delay. Any delay for contaminated materials relating to temporary Work shall not be considered a MDOT-Caused Delay.

If Contaminated Materials are involved, see Book 2, Section 4.

5.3.3 Recomence Work

MDOT shall have the right to require Contractor to recommence Work in the area at any time, even though an investigation may still be ongoing (so long as such Work is not in violation of any Governmental Rules or Governmental Approvals). Contractor shall promptly recommence Work in the area upon receipt of notification from MDOT to do so. On recommencing Work, Contractor shall follow all applicable procedures contained in the Contract Documents and all other Governmental Rules with respect to such Work, consistent with MDOT's determination or preliminary determination regarding the nature of the material, resources, species or condition.

5.3.4 Alternative Procedure

Notwithstanding the foregoing, to the extent that any Governmental Approval specifies a procedure to be followed which differs from the procedure set forth herein, Contractor shall follow the procedure set forth in the Governmental Approval. This work may be considered a MDOT-Directed Change per Book 1, Section 13.

<Omitted>

13.9 Differing Site Conditions

13.9.1 Responsibilities of MDOT

Upon Contractor's fulfillment of all applicable requirements of Book 1, Sections 5.3 and 13, and subject to the limitations contained therein, MDOT shall be responsible for, and agrees to issue Change Orders, (a) to compensate Contractor for additional costs directly attributable to changes in the scope of the Work arising from Differing Site Conditions.

13.9.2 Burden of Proof

Contractor shall bear the reasonable burden of proving that a Differing Site Condition exists and that it could not reasonably have worked around the Differing Site Condition so as to avoid additional cost. Each request for a Change Order relating to a Differing Site Condition shall be accompanied by a statement signed by a qualified professional setting forth all relevant assumptions made by Contractor with respect to the condition of the Site, justifying the basis for such assumptions, explaining exactly how the existing conditions differ from those assumptions, and stating the efforts undertaken by Contractor to find alternative design or construction solutions to eliminate or minimize the problem and the associated costs.

<Omitted>

EXHIBIT 1-A – ACRONYMS AND DEFINITIONS

A.2 Definitions

<Omitted>

Differing Site Conditions

- (a) subsurface or latent physical conditions that differ from those reasonably assumed by Contractor based on incorrect boring logs provided in Book 2 to the extent that correct boring logs would have resulted in accurate assumptions, or
- (b) physical conditions of an unusual nature, differing materially from those ordinarily encountered at the Site and generally recognized as inherent in the Work provided for in the Contract, provided in all cases that Contractor had no actual or constructive knowledge of such conditions as of the Proposal Due Date.

The foregoing definition shall not apply to Utilities, or Force Majeure events, nor shall it include any differences in groundwater depth or subsurface moisture content from that identified in the RFP. Clause (a) of this definition shall specifically exclude situations in which accurately reported boring data does not represent prevailing conditions in the area.

Refer also to:

13.11 Contaminated Materials Management

Clause Code:	017-DSC-02
Clause Type:	Differing Site Conditions
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

CONTRACT DOCUMENTS PART 2

DB SECTION 100 CONTRACT PROVISIONS

DB SECTION 101 ABBREVIATIONS, SYMBOLS, AND TERMS AND DEFINITIONS

DB 101-3 CAPITALIZED TERMS

DB 101-4 OTHER DEFINITIONS <Omitted>

[D]iffering site condition – Subsurface or latent physical conditions that are encountered at the Site and differ materially from the conditions indicated in the Contract, and unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of Work provided for in the Contract. Site conditions shall be considered indicated in the Contract only to the extent specified in DB §104-5, and claims based on differing site conditions are subject to the restrictions and limitations set forth in DB §104-5. <Omitted>

DB SECTION 104 SCOPE OF WORK

DB 104-5 DIFFERING SITE CONDITIONS

DB 104-5.1 Differing Site Conditions Generally

During the progress of the Work, if subsurface or latent physical conditions are encountered at the Site differing materially from those indicated by the Department for specific locations where the Department's tests were taken and to the degree of accuracy indicated in the Contract—or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in the Contract are encountered at the Site—the party discovering such conditions shall promptly notify the other party to the Contract in writing of the specific differing conditions within 10 days of the discovery and before they are disturbed, or as soon as practicable thereafter, and before the affected Work continues.

A) Grounds for a differing site condition claim exist when the information indicated in the geotechnical borings and/or tests provided by the Department in *Part 7 – Engineering Data* is established to be materially inaccurate at the specific location(s) of those borings or tests, to the extent that correct boring data would have resulted in accurate assumptions regarding site conditions by the Design-Builder, and provided Design-Builder had no actual or constructive knowledge of such conditions as of the Proposal Date. The Department represents that, to the best of its knowledge, the information represented by the borings and tests taken by the Department are accurate at the location of the borings and tests to the degree of accuracy indicated in the Contract. Any extrapolation of such information to other locations by the Design-Builder shall be at the Design-Builder's risk.

B) Grounds for a differing site condition claim also exist in the event of discovery of physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of work provided for in the Contract, provided Design-Builder had no actual or constructive knowledge of such conditions as of the

Proposal Date, and Design-Builder would not have discovered the condition by making a reasonable site investigation, exploration and desktop documentary study during the preconstruction phase.

C) Upon written notification, the Department's Project Manager shall, within a reasonable time, investigate the conditions. If the Department's Project Manager determines that a differing site condition exists that causes an increase in the cost required for the performance of any Work under the Contract for which a claim may be made pursuant to either (A) or (B), above, and/or has delayed a Critical Path, an adjustment that excludes anticipated profit but includes cost of Critical Path delays will be made, and the Contract will be modified in writing, in accordance with DB §109-15. The Department's Project Manager shall notify the Design-Builder of the determination and whether or not an adjustment of the Contract is warranted.

D) No claim of the Design-Builder under this clause shall be allowed unless the Design-Builder has given the notice required herein. If the Department's costs are increased as a result of any delay by the Design-Builder in ascertaining conditions and providing notice, the damage that could have been mitigated by earlier notice will be calculated and any Contract adjustment will be reduced accordingly. No claim by the Design-Builder for an adjustment shall be allowed if submitted after final payment under the Contract.

E) No claim may be made for conditions discovered during construction which might be considered unknown physical conditions at the Site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in the Contract, if a reasonable site investigation and exploration during the pre-construction phase would have indicated the condition.

F) The Design-Builder shall bear the burden of proving that a differing site condition exists and that it could not reasonably have designed the Project or worked around the differing site condition so as to avoid additional cost by resequencing, reallocating or redeploying its forces to other portions of the Work or to other activities unrelated to the Work (with the understanding that any additional costs reasonably incurred in connection with such reallocation or redeployment are allowable). Each request for an Order on Contract based on differing site conditions shall be accompanied by a statement signed by a qualified professional setting forth all relevant assumptions made by the Design-Builder with respect to the condition of the Site, justifying the basis for such assumptions and explaining exactly how the existing conditions differ from those assumptions, and stating the efforts undertaken by the Design-Builder to find alternative design or construction solutions to eliminate or minimize the problem and the associated costs.

G) The Design-Builder's rights under this section do not excuse the Design-Builder from its responsibility to determine what additional geotechnical information is required to support its design and construction, to obtain such information and to ensure that such information is accurate.

The notice requirements specified herein also apply to DB §104-4.2. The notice, recordkeeping and other requirements of DB §§104-6, 104-7, 108-6, 109-9, 109-10 and 109-15 also shall apply with respect to any request to adjust the Contract Price or the Contract Time due to a differing site condition.

Clause Code:	018-DSC-03
Clause Type:	Differing Site Condition
Project Name:	I-5, Joe Leary Slough to Nulle Road VIC - Paving
Owner Name:	Washington DOT
Year Published:	2010

Design-Build Contract

Chapter 1 General Provisions

<omitted>

1-04.7 DIFFERING SITE CONDITIONS (CHANGED CONDITIONS)

For Work unrelated to an ATC, Differing Site Conditions shall mean (a) actual subsurface or latent physical conditions encountered at the Site that are substantially or materially different from the conditions identified in the RFP Chapter 2 Section 2.6, Section 2.7, PRM in Appendix J2 and other data in Appendices G1 and J1, as set forth in Section 1-02.4(2) and which are not discoverable from a reasonable investigation and analysis of the site, or (b) physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of Work provided for in the Contract and the Work site characteristics, provided in all cases that the Design-Builder had no actual or constructive knowledge of such conditions as of the Proposal Due Date.

For Work related to an ATC, Differing Site Conditions shall mean (a) actual subsurface conditions or latent physical conditions encountered at the Site that are substantially or materially different from the conditions indicated in the Design-Builder's geotechnical investigation conducted for purposes of the ATC prior to the Proposal Due Date (to the extent said investigation complies with the WSDOT Geotechnical Design Manual), and which are not discoverable from a reasonable investigation and analysis of the site, or (b) physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of Work provided for in the Contract and the Work site characteristics, provided in all cases that the Design-Builder had no actual or constructive knowledge of such conditions as of the Proposal Date.

Drilled shafts with a diameter greater than or equal to 4.00 feet shall not be eligible for differing site conditions.

Abandoned infrastructure above or below ground, such as storm drainage pipes, drainage structures, bridge foundations, utilities, pavement, and construction debris, encountered within excavation areas shall not be considered a Differing Site Condition. The party discovering such conditions shall promptly notify the other party in writing of the specific Differing Site Conditions before they are disturbed and before the affected Work is performed. Such notification shall identify the conditions represented in the Contract Documents, the conditions encountered at the site, and an explanation of the difference.

Upon written notification, WSDOT will investigate the conditions and if it determines that the conditions materially differ and cause an increase or decrease in the cost or time required for

the performance of any work under the Contract, an adjustment, excluding loss of anticipated profits, will be made and the Contract modified in writing accordingly. WSDOT will notify the Design-Builder of its determination whether or not an adjustment of the Contract is warranted.

Notwithstanding the above, the Design-Builder shall be entitled to an equitable adjustment adjusting the Contract Price only for the actual, reasonable cost increase resulting from Differing Site Conditions which in the aggregate exceeds \$500,000.00. The responsibility for the first \$500,000.00 worth of Differing Site Conditions shall rest solely with the Design-Builder. RFP Chapter 2, Sections 2.6 and 2.7 identified and quantified the working elements that the Design-Builder is responsible for, toward the first \$500,000.00 worth of Differing Site Conditions.

No Contract adjustment which results in a benefit to the Design-Builder will be allowed unless the Design-Builder has provided the required written notice.

The equitable adjustment will be by agreement with the Design-Builder. However, if the parties are unable to agree, WSDOT will determine the amount of the equitable adjustment in accordance with Section 1-09.4. Extensions of time will be evaluated in accordance with Section 1-08.8.

If WSDOT determines that Differing Site Conditions do not exist and no adjustment in costs or time is warranted, such determination shall be final as provided in Section 1-05.1.

No claim by the Design-Builder shall be allowed unless the Design-Builder has followed the procedures provided in Section 1-04.5 and 1-09.11.

1-04.7(1) BURDEN OF PROOF

The Design-Builder shall bear the burden of proving that a Differing Site Condition exists and that it could not reasonably have worked around the Differing Site Condition so as to avoid additional cost. Each request for a Change Order under this Section 1-04.7 shall be accompanied by a statement signed by a qualified professional setting forth all relevant assumptions made by the Design-Builder with respect to the condition of the Site, justifying the basis for such assumptions and explaining exactly how the existing conditions differ from those assumptions, and stating the efforts undertaken by the Design-Builder to find alternative design or construction solutions to eliminate or minimize the problem and the associated costs.

1-04.7(2) INSURANCE CLAIMS

Prior to filing any request for a Change Order relating to a Differing Site Condition, the Design-Builder shall inquire if insurance proceeds may be available to cover costs in connection with such item. If the Design-Builder finds that reasonable grounds for filing an insurance claim exist, then the Design-Builder shall so notify WSDOT. WSDOT shall not be in default for failure to pay any amounts which the Design-Builder or WSDOT finds may be covered by insurance, unless and until the claim is denied by the insurance company. The Design-Builder shall maintain contemporaneous records of all costs incurred by it with

respect to the Differing Site Condition pending the insurance company's determination regarding the claim. Upon denial of any such claim by the insurance company and receipt of a Change Order request, WSDOT will process the Change Order request. WSDOT shall have the right to contest the denial of any insurance claim, and the Design-Builder shall cooperate with WSDOT in that regard. Notwithstanding anything to the contrary contained in Section 1-04.4, the Design-Builder shall not be obligated to include amounts which may be covered by insurance in any Change Order request until 20 Calendar Days after the insurance company has denied the claim. However, the notice requirements of Section 1-04.4 shall remain effective with respect to the event in question.

Refer also to:

1-02.4(2) SUBSURFACE INFORMATION

1-05.1 AUTHORITY OF WSDOT

Clause Code:	019-EP-01
Clause Type:	Environmental Permitting
Project Name:	Federal Aid Bridge Replacement Project Cherokee, Chester, Fairfield, Lancaster, and York Counties
Owner Name:	South Carolina DOT
Year Published:	2014

II. PROJECT SCOPE

A. Scope of Work

CONTRACTOR shall furnish all services, labor, materials, equipment, supplies, tools, transportation, and coordination required to perform all design, preliminary engineering, surveying, geotechnical services, scheduling, permitting, maintenance of traffic, right of way services, procurement, construction, utility coordination, demolition, material disposal and any other services necessary to perform the Project as defined in the Project Scope of Work made a part hereof as **EXHIBIT 3**.

B. Design and Construction Responsibilities

1. CONTRACTOR, consistent with applicable state licensing laws, shall provide, through qualified South Carolina licensed design professionals employed by CONTRACTOR or procured from qualified, independent South Carolina licensed design consultants, the necessary design work, including, but not limited to, surveys, right of way services, roadway design, maintenance of traffic, geotechnical exploration and design, hydraulic analyses, storm water management, erosion control, superstructure design, and foundation and substructure design including seismic analyses for the preparation of the required drawings, specifications and other design submittals to permit CONTRACTOR to complete the work in accordance with the Contract.

2. CONTRACTOR shall provide through itself or subcontractors the necessary supervision, labor, inspection, testing, material, equipment, machinery, temporary utilities and other temporary facilities to permit performance of all demolition, earthwork, drainage, foundation work, maintenance of traffic, roadway work, structural work, excavation, erosion and sediment control work, field layout work, construction management and inspection, and all other work necessary to complete construction of the Project in accordance with the Contract. CONTRACTOR shall perform all design and construction activities efficiently and with the requisite expertise, skill and competence to satisfy the requirements of the Contract. CONTRACTOR at all times shall exercise control over the means, methods, sequences and techniques of construction. CONTRACTOR's operations and construction methods shall comply with all applicable federal, state and local regulations with regard to worker safety, protection and health and protection of the environment and applicable permit requirements.

3. CONTRACTOR shall design and construct the project in such a manner that the construction limits are contained within the existing right of way to the extent possible. Where new right of way is required to construct the Project, the CONTRACTOR shall design and construct the Project so as to minimize the additional rights of way needed. The acquisition of rights of way, including both cost and services to acquire, shall be the responsibility of the CONTRACTOR and shall be done in accordance with Article VIII of this Agreement. CONTRACTOR shall furnish the SCADOT a copy of any agreements for the use of additional properties not acquired as right of way that are used in conjunction with the construction of this Project. CONTRACTOR shall abide by the provisions of all applicable environmental permits, any conditions of individual right of way

agreements, and all environmental commitments. The CONTRACTOR shall sign the Contractor Certification Form which will be made part of the contract.

4. It shall be the responsibility of CONTRACTOR to determine and comply with all applicable federal, state, and local laws in connection with the services set forth in this Contract. This obligation shall include, but not be limited to, procurement of all permits and licenses not obtained by SCDOT provided, however, that with respect to any permit or licenses that must be obtained in the name of SCDOT, CONTRACTOR shall perform all functions within its power to obtain the permit, and SCDOT will fully cooperate in this effort and perform any functions that must be performed by SCDOT. CONTRACTOR shall be responsible for payment of all charges, fees, and taxes, and for providing all notices necessary and incident to the performance of the Project as of the Effective Date of this Agreement. The Contract Price shall include fees related to the above obligations and if any fees are waived by the regulatory or governmental entity, then the amount of the fee waived shall be deducted from the Contract Price.

IX. PERMITS

A. All permits necessary for completion of this project shall be procured by the CONTRACTOR. All costs of obtaining the permits, including any mitigation required by permits, shall be the responsibility of the CONTRACTOR. The CONTRACTOR shall comply with all local, state, and federal permitting requirements. Regarding any permit or license that must be obtained in the name of SCDOT, the CONTRACTOR shall perform all functions within its power to obtain the permit or license, and SCDOT shall fully cooperate in this effort and perform any functions that must be performed by SCDOT. The CONTRACTOR shall submit permit applications to SCDOT. SCDOT will submit the permit application to the appropriate permitting agency indicating that CONTRACTOR is acting as an agent for SCDOT. If said regulatory agencies fail to issue permits in a timely manner, SCDOT may, on an individual basis, consider a time extension for permit approval delays when CONTRACTOR can demonstrate that the application was submitted in a timely manner, all reasonable efforts have been made to expedite the permit approval, and that the delay has a direct impact on the Critical Path. CONTRACTOR shall not be entitled to additional compensation for delays in permit approval.

B. All necessary permit modifications shall be the CONTRACTOR's responsibility.

All work associated with permit modifications as a result of changes proposed by CONTRACTOR shall be CONTRACTOR's responsibility. See Article II.B.4 regarding deductions for waived fees.

X. ENVIRONMENTAL COMPLIANCE

A. Compliance with Environmental Commitments

CONTRACTOR shall comply with all Environmental commitments and requirements including, but not limited to, the following:

1. Compliance with the provisions of all environmental permits applicable to the Project. A copy of the environmental document is included in **Attachment B**. Environmental Commitments are included in **Exhibit 8**.
2. Compliance with those stipulations and conditions under which SCDOT received approval of the Environmental Document(s) and any modifications resulting from a re-evaluation of the Document(s). If the CONTRACTOR elects to construct the Project in a manner that is not consistent with the assumptions in the SCDOT prepared environmental documents, the CONTRACTOR will be responsible for revising the environmental documents and provide any additional studies that may be required. All revisions will require SCDOT and FHWA approval prior to any right of way acquisition or construction activity;

3. Compliance with applicable laws and regulations relating to potential or actual hazardous materials that may be encountered in the course of carrying out this Agreement;
4. Carrying out all necessary social, economic, and environmental studies required by regulatory authorities in the course of construction;
5. Preparation of any permits required by federal, state, or local laws or regulations; The CONTRACTOR is responsible for any mitigation required by permits; and
6. The resolution of any deviations from the contract documents, drawings or other information included in the environmental permits that would violate the intent or spirit of the permits. Any proposed changes within the permitted areas would need to be coordinated with SCDOT's Environmental Management Office.

B. Preconstruction / Partnering Conference(s)

CONTRACTOR shall conduct one (or more, if appropriate) pre-construction / partnering conference(s) prior to any construction activity to discuss environmental and permitting issues, which conference shall include all subcontractors, and, to the extent feasible, representatives from the U.S. Army Corps of Engineers, the S.C. Department of Health and Environmental Control Water Quality Division, the Federal Highway Administration, CONTRACTOR, and SCDOT.

C. Protection of Archeological and Paleontological Remains and Materials

1. When archeological or paleontological remains are uncovered, CONTRACTOR shall immediately halt operations in the area of the discovery and notify SCDOT.
2. Archeological remains consist of any materials made or altered by man which remains from past historic or prehistoric times (i.e. older than 50 years). Examples include old pottery fragments, metal, wood, arrowheads, stone implements or tools, human burials, historic docks, structures or not recent (i.e. older than 100 years) vessel ruins. Paleontological remains consist of old animal remains, original or fossilized, such as teeth, tusks, bone, or entire skeletons.
3. SCDOT will have the authority to suspend the work for the purpose of preserving, documenting, and recovering the remains and materials of archeological and paleontological importance for the State. CONTRACTOR shall carry out all instructions of SCDOT for the protection of archeological or paleontological remains, including steps to protect the site from vandalism and unauthorized investigations, from accidental damage and from dangers such as heavy rainfall or runoff.
4. CONTRACTOR's Contract Time and or Contract Price shall be adjusted to the extent CONTRACTOR's cost and /or time of performance have been adversely impacted by the presence of archeological or paleontological remains.

XI. HAZARDOUS MATERIALS

- A. For all bridges, except for the I-85 Northbound Bridge over Norfolk Southern Railroad, CONTRACTOR is referred to the Project Information Package for information regarding Hazardous Materials Surveys. For the I-85 Northbound Bridge over Norfolk Southern Railroad and the S-11-41 Bridge over Peoples Creek in Cherokee County, CONTRACTOR is responsible for acquiring a Hazardous Materials Survey. The cost of the surveys shall be included in the Contract Price. CONTRACTOR is responsible for developing a remedial strategy to address any Hazardous materials, wastes, substances or chemicals on the Project. The CONTRACTOR shall remove and dispose of the structural steel components containing lead-based paints or asbestos in compliance with all applicable Federal (EPA, OSHA & DOT) and State requirements for asbestos, lead as waste, lead in air, lead in water, lead in soil, and worker health and safety. With the exception of the I-85 Northbound Bridge, the cost the removal and disposal of components containing lead-based paints or asbestos shall be included in the Contract Price. The CONTRACTOR is responsible for obtaining all required permits to proceed with the work.

XII. DEMOLITION, REMOVAL & DISPOSAL OF STRUCTURES

CONTRACTOR shall be responsible for the demolition, removal and disposal of all structures and their appurtenances within SCDOT Right of Way necessary for the completion of the Project, to include those portions which may extend outside the right of way, but were purchased as a part of the acquisition process. Structures shall include the bridges identified in the scope of work, all foundations from previous bridges as set forth in the Scope of Work, and all buildings acquired for the Project. All necessary permitting shall comply with Articles II.B.4 and IX of the Contract. Handling and disposal of Hazardous Material shall be in accordance with Article XI of the Contract. Before demolition of the structures, the CONTRACTOR shall complete and submit a Notification of Demolition and Renovation form to the South Carolina Department of Health and Environmental Control.

Exhibit 3 - Scope of Work

Environmental

SCDOT has prepared the necessary environmental documents consistent with the National Environmental Policy Act process including any necessary studies. If the CONTRACTOR elects to replace a bridge in a manner that is not consistent with the assumptions in the SCDOT prepared environmental documents, the CONTRACTOR is responsible for revising the environmental documents and providing any additional studies that may be required. All revisions to environmental documents require SCDOT and FHWA approval prior to any right-of-way acquisition or construction activity. If work outside of the assumptions in the environmental document is required to construct any of the bridges, the CONTRACTOR shall contact the Department about the need for additional cultural resources investigations. If required by the Department, the CONTRACTOR will be responsible for performing these additional investigations.

The Project includes the preparation of any permits required by federal, state, or local laws or regulations. For those permits that must be submitted in the name of SCDOT, the CONTRACTOR shall forward the permit applications to SCDOT for review and submission. Where possible, SCDOT will assign the CONTRACTOR to act as the SCDOT's agent in coordinating permit approval. The CONTRACTOR is responsible for any mitigation required by permits.

<Omitted>

(25) SECTION 107: PERMITS:

All permits necessary for completion of this project shall be procured by the Contractor. Failure to adequately comply with the provisions of permits or any other requirements from the permitting agencies will result in the stoppage of contract operations until corrective actions have been taken. Fines assessed by permitting agencies to the Department as the result of the Contractor's noncompliance or violation of said permit provisions will be paid by the Department and subsequently deducted from the Contractor's monthly pay estimate.

(107) SECTION 815: EROSION CONTROL MEASURES:

In addition to the erosion control measures specified in the Plans, Standard Specifications, Supplemental Technical Specifications and the Special Provisions, the Contractor is advised that all land disturbing activities (clearing and grubbing, excavation, borrow and fill) are subject to the requirements set forth in the following permits and regulations:

- South Carolina Code of Regulations 63-380, Standard Plan for Erosion, Sediment, and Stormwater SCDHEC) the authority to administer the Federal NPDES permit program in the State of South Carolina.

In accordance with the NPDES General Permit, the Contractor must sign a Contractor Certification. The certification is incorporated into the proposal form for the Contract. By signing this form, the Contractor acknowledges that upon award and execution of the Contract, he/she accepts/understands the terms and conditions of the *Storm Water Pollution Prevention Plan (SWPPP)* as required by the NPDES General Permit and may be legally accountable to SCDHEC for compliance with the terms and conditions of the *SWPPP*. In addition, the Contractor certifies that the NPDES certification statement status is made part of all its subcontracts.

The Contractor will complete and forward an updated SCDOT approved *Notice of Intent (NOI)* to the SCDOT Construction office to submit to SCDHEC. If the Coastal Zone Consistency (CZC) permit has not been approved it shall be forwarded by the Contractor to SCDOT to submit to SCDHEC as part of *NOI* package. If SCDHEC does not send a letter within 10 business days of receipt of the *NOI*, authorizing coverage, denying coverage, or advising that a review of the *CECP* will take place, coverage will be automatically granted.

Prepare and submit a *Contractor's Erosion Control Plan (CECP)* to the RCE before the preconstruction conference. Ensure that the plan meets the requirements of the NPDES General Permit. The plan will be reviewed and approved by the Department before commencing any land disturbing activities.

At the pre-construction conference, with contactors performing land-disturbing activities present, the *CECP* will be explained and discussed so that the Contractor is made aware of their responsibilities in the *CECP*.

Once approved, fully implement the *CECP*. Coordinate the prompt installation of erosion control devices with construction activities to maintain compliance with the above regulations and NPDES General Permit.

Conduct an Erosion and Sediment Control Inspection by an appointed Certified Erosion Prevention and Sediment Control Inspector (CEPSCI) from the Contractor and the Department at least every 7-calendar days. Both parties will acknowledge participation in the inspection by signing the inspection report and include their inspector's CEPSCI number on the report. Correct deficiencies noted during these inspections within the assigned priority period. If deficiencies are not corrected within this timeframe, the RCE will stop all work (except erosion and sediment control measures) until the deficiencies are corrected.

Give special attention to critical areas within the project limits (i.e., running streams, water bodies, wetlands, etc.). In these areas, the RCE may direct the Contractor to undertake immediate corrective action, but in no case allow these deficiencies to remain unresolved more than 7 days or 48 hours in accordance with their assigned priority after being identified during the Erosion and Sediment Control Inspection.

Closely follow the grading operations with the seeding operations. Shape and prepare the slopes for seeding as the grading progresses. Unless the RCE grants prior written approval, limit the amount of surface area exposed by land disturbing activities to 750,000 square feet.

Commence seeding operations within 7 days following completion of construction activities within an area.

Initiate stabilization measures within 7 days for an area where construction activities will be temporarily or permanently ceased for 14 days or longer.

Coordinate the installation of all other permanent erosion control items with the grading and seeding operations. These items include, but are not limited to, asphalt gutter and riprap. Construct gutter work before or promptly after the seeding is performed. Place riprap at the ends of pipe immediately after the pipe is laid and promptly install riprap ditch checks after ditch work has been performed.

Failure to adequately comply with the provisions as detailed above or any other required erosion control measures will result in stoppage of all contract operations (except erosion and sediment control measures) until corrective action has been taken. Additional sanctions may be invoked by the SCDHEC in accordance with their authority.

Keep the following documents at the RCE's office from the start of construction until the site is finally stabilized:

- Copy of the *CECP*,
- Copies of Contractor Certification statements,
- Copy of the permit,
- Letter from DHEC authorizing permit coverage if provided by SCDHEC, and
- A marked-up set of site plans.

When uniform perennial vegetation achieves a cover density of 70%, submit a *Notice of Termination (NOT)* to SCDHEC to terminate coverage. Include a signed statement with the *NOT* certifying that all work on the site has been completed in accordance with the *SWPPP* and the NPDES General Permit for all sites one acre or greater.

Fines assessed on the Department by SCDHEC as the result of the Contractor's noncompliance or violation of said permit provisions will be paid by the Department and will subsequently be deducted from any monies due or that may become due to the Contractor. In case no monies are due or available, the fines incurred will be charged against the Contractor's Surety.

Proposed Bridge Replacement on S-12-141 (Brooklyn Road) over Rocky Creek in Great Falls, South Carolina (Chester County)

- A Duke Energy Conveyance Permit will be completed by the design-build team as part of the permitting process, prior to construction activities. A copy of the Duke Energy Conveyance Application Form is included in Appendix D of CE.
- Impacts to jurisdictional waters will be permitted and appropriately mitigated, if required, under a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary engineering, it is anticipated that the proposed project would impact approximately 85 linear feet of Rocky Creek and permitted under SCDOT's General Permit (GP). Any required compensatory mitigation requirements for permanent project impacts will be provided through an approved USACE mitigation plan.
- Construction within the floodplain will be consistent with FEMA regulations. The bridge will be replaced as part of a design/build contract. If necessary, a detailed hydraulic analysis will be performed during the final design phase. The contractor will be required to construct a minimum structure length, minimum low chord and minimum channel opening. A letter of concurrence will be obtained from the Chester County Floodplain Manager prior to construction and a No-Rise Certification will also be obtained. A letter of coordination with the Chester County Floodplain Manager was sent November 29, 2011 (Appendix A of CE). Coordination with the Floodplain

Manager will continue throughout the process and they will be notified once the final hydraulic analysis is complete.

- The bridge is located in the vicinity of a SCDHEC 303(d) listed water (Rocky Creek) and stormwater control measures, both during construction and post-construction, will be in accordance with SCDOT's MS4 Permit.
- The acquisition and disturbance of hazardous waste will be avoided, if possible. If avoidance is not a viable alternative, hazardous materials will be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and the South Carolina Department of Health and Environmental Control requirements. <Omitted>

Clause Code:	020-EP-02
Clause Type:	Environmental Permitting
Project Name:	I-69 and Pennyrile Parkway Interchange Reconstruction
Owner Name:	Kentucky DOT
Year Published:	2013

10. ENVIRONMENTAL

10.1 NEPA Document

A Categorical Exclusion Level 3 has been completed by the KYTC for this project. This environmental document assumes that all construction will be within the designated right of way. If this is not what is proposed, the DBT shall be responsible for any additional environmental work for areas outside the existing right of way. Any significant changes from the scope may invalidate the NEPA CE Level 3 approval, and therefore would not be acceptable.

10.2 Waterway Permits

The KYTC will obtain all necessary Nationwide 401/404 permits within the right of way and the DBT will be required to obtain all necessary permits from the appropriate Federal, State or Local government agencies for any excess material or borrow sites needed outside that established right of way. The DBT will be required to have all NPDES and BMP and erosion control measures for the project.

It is required that the bidder be aware of Section 404 and 401 permits and certifications requirements for all projects impacting “waters of the US”. The level of permit required, that is Nationwide versus Individual 404 and 401, is determined by the exact amount of impact to “waters of the US”, (i.e., acreage of fill activities in a stream or wetland or linear feet of work in a stream) and in some cases the waters impacted. All individual 404 Permits require 401 Water Quality Certification. Nationwide Permits are activity specific permits used to authorize projects with minor impacts. Projects with more than minor impacts require individual review by the U.S. Army Corps of Engineers and the KY Division of Water.

10.3 National Pollutant Discharge Elimination System (NPDES) Permit and Best Management Practices (BMP) Plan

The DBT must submit to the project manager a BMP plan for the project and receive approval prior to beginning work. All temporary erosion control is the responsibility of the DBT. The DBT will be responsible for filing the Notice of Intent (NOI) with the Kentucky Division of Water.

Clause Code:	021-EP-03
Clause Type:	Environmental Permitting
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

CONTRACT DOCUMENTS PART 3 PROJECT REQUIREMENTS

SECTION 2 PROJECT MANAGEMENT

2.1 DESIGN-BUILDER'S ROLE

The Design-Builder shall have responsibility for controlling and managing the Work. This includes the Design-Builder's responsibility for quality management as defined in the Contract Documents, Part 2 - DB §§ 111, 112 and 113.

2.2 DESIGN-BUILDER'S KEY PERSONNEL

The positions listed below shall be the Design-Builder's key personnel for the Project. The Design-Builder shall provide personnel that meet these minimum requirements. The Design-Builder's Project Manager shall be the Design-Builder's representative and single point of contact.

<Omitted>

P) **Environmental Compliance Manager:** Shall have a minimum of 10 years demonstrated experience in the environmental permitting process and associated requirements, environmental design, and construction management and compliance on large, complex transportation projects with complex environmental permitting requirements and commitments. This experience should be in relation to federal permitting requirements and environmental regulatory agencies and should preferably also include experience of New York State permitting requirements. The Environmental Compliance Manager should have experience in managing others in environmental activities, with highway and bridge engineering drawings and concepts, and working cooperatively and effectively with design engineers and construction staff.

<Omitted>

SECTION 3 ENVIRONMENTAL COMPLIANCE

3.1 SCOPE

Except as otherwise detailed herein, the Design-Builder shall be responsible for preparing its design, carrying out its construction activities and undertaking other activities as needed to ensure compliance with the Project's Environmental Requirements, which include:

- A) The terms and conditions of Environmental Approvals as listed within Section 3.4 herein required from various state, local and federal agencies;
- B) The requirements as set forth herein; and
- C) All applicable Environmental Laws and Regulations.

3.2 REQUIREMENTS

3.2.1 General

- A) Unless otherwise indicated in the Contract Documents, the Department will be

responsible for obtaining all Environmental Approvals as identified in Table 3.4-1. Refer to Part 7 – Engineering Data for permit applications submitted to date by the Department. For those Environmental Approvals not secured as of the date of this Contract, the Design-Builder shall cooperate with and assist the Department in securing the approvals and monitoring during construction as identified in Exhibit B to this Project Requirement.

- B) In the event the Design-Builder requests changes to the permits obtained by the Department, the Design-Builder shall obtain any required permit modifications. The Design-Builder shall be responsible for the preparation of all information including materials, investigations, testing and documentation, as necessary to support said permit modification. The Department will not be responsible for any delay or additional cost associated with the Design-Builder's requested permit modification.
- C) The Design-Builder shall be responsible for obtaining all new Environmental Approvals and any changes to existing Environmental Approvals required for by the Design-Builder's design but not previously permitted. For any such approvals required to be obtained by the Design-Builder that must formally be issued in the Department's name, the Department will cooperate with the Design-Builder as reasonably requested by the Design-Builder, including execution and delivery of appropriate applications and other documentation prepared by Design-Builder in a form approved by the Department.
- D) The Design-Builder shall procure all Environmental Approvals as needed for all Design-Builder-located areas, including staging and disposal sites, and any other areas used by the Design-Builder in the construction of the Project for its convenience.
- E) For the Design-Builder-located areas, the Design-Builder shall notify the Department of scheduled meetings with regulatory agencies and provide to the Department copies of any documentation regarding environmental compliance.
- F) The Design-Builder shall be solely responsible for compliance with and violations of any Environmental Requirements.
- G) The Design-Builder shall indemnify the Department and the State of New York for any fines, violations or damages incurred by reason of failure of the Design-Builder to comply with Environmental Approvals.
- H) The Design-Builder shall construct a cap including fencing and drainage on a portion of the former Phelps Dodge Refining Site in Queens per the Directive Drawings included in Part 6 – RFP Plans. The cap shall be installed by the Design-Builder before construction on and adjacent to the area to be capped can begin. The construction activities on the cap are subject to the loading restrictions included in the Directive Plans. The Design-Builder shall relocate the unused stockpiled soil from Parcel 1A to Parcels 2 and 1C as indicated in the Capping Plans. The Design-Builder shall provide a minimum of 10 days' notice to Phelps Dodge Refining Corporation (PDRC) before the movement of the stockpiled soil on Parcel 1A to allow for a PDRC inspector to be onsite during any such movement.
- I) The Design-Builder shall provide access to the PDRC inspector and NYSDEC personnel on Parcels 1A and 2 for monitoring and maintenance of the existing Ground Water Treatment System as required.
- J) The Design-Builder shall be responsible for complying with the Monitoring Program on the Laurel Hill Site. See Part 6 – RFP Plans. The Department will install the monitoring program prior to award of the Design-Build Contract. The intent of the program is to monitor soil movements and groundwater movements associated with the sheet pile wall that is intended to prevent movement of groundwater from the site into Newtown Creek. Based on readings taken during the RFP phase, the Department intends to establish allowable tolerances for the monitoring program. A layout of the plan is indicated on the

capping plans. Two months after award of the contract the Design-Builder shall take over responsibility for maintaining the monitoring and for continuing the readings. If the readings indicate that due to the Design Builder's activities, the wall has been compromised and that groundwater from the site is moving through the wall into the creek, it may be necessary to halt construction in the vicinity of the wall and remediate the wall until the work can be restarted at the site. The Design Builder shall be responsible for any such delays if they are attributed to the activities of the Design-Builder. K) The Design-Builder shall take the appropriate actions to limit the potential for propeller scour in Newtown Creek. Provisions shall include limiting the drafts, horsepower and operating speeds of tugboats in the Creek as required. The requirements for monitoring turbidity are described in 3.2.5N below.

L) The Design-Builder shall coordinate with PDRC on all aspects of the project that will affect the Laurel Hill site, including the following: capping of Parcels 1A, 9A and 2; construction of the temporary platform on the northern side of Newtown Creek; construction of the temporary bridge over the barrier wall installed as part of the groundwater collection and treatment system ("GWTS"); geotechnical borings for and construction of support piers on Parcels 2 and 5; implementation of the monitoring program; and removal of any temporary piers from the construction of the temporary platform and temporary bridge over the barrier wall (collectively, "Laurel Hill Activities"). Coordination with PDRC shall include providing a) a minimum of 5 days' notice to PDRC of any Laurel Hill Activities so that such representative may be present to observe any such activities, if deemed necessary by PDRC; b) relevant progress reports required by DOT and/or DEC to PDRC at the same time they are submitted to the agencies; c) PDRC or its representative 5 business days to review and comment on any significant design modifications or field decisions related to Laurel Hill Activities; and d) PDRC or its representative an opportunity to take split samples of any sampling conducted in accordance with the required monitoring plan or otherwise.

3.2.2 Construction Noise

The Design Builder shall conduct all work to meet the commitments made in the ROD and the requirements of the NYC Noise Code.

3.2.3 Cultural Resources Protection

Per the 2008 Memorandum of Agreement between FHWA, the Department and NYSHPO, the Department has prepared a revised Archaeological Area of Potential Effect (APE), Archaeological Work Plan (AWP), Historic American Engineering Record (HAER), and Construction Protection Plan for Old Calvary Cemetery (CPP). The Department has obtained FHWA and NYSHPO approval for the APE, AWP, HAER and CPP. Before the start of construction the Design-Builder shall revise, if required, the approved Archaeological Work Plan and approved Construction Protection Plan provided by the Department and obtain Department, FHWA and NYSHPO approval of the revised Plans. It is noted that the plan identifies possible significant shipwrecks that are in the project area in Newtown Creek. The Design-Builder shall carry out the requirements set forth in the approved plans including requirements for an on-site archaeologist.

3.2.4 Ecological Management

The Design Builder shall be required to comply with all conditions of the permits.

3.2.5 Contaminated Materials Management

A) The Design-Builder is advised that previous investigations identified contaminated soil, groundwater, and soil vapor at the project site. The results of previous investigations conducted by the Department for the project are available in the *Contaminated Material Investigation Findings Report, Kosciuszko Bridge Reconstruction Project, Brooklyn and Queens, NY, May 30, 2012 (EPM, Inc.)*. The conditions identified include nonhazardous and hazardous contaminated soil, groundwater impacted with petroleum, chlorinated solvents, heavy metals, and soil vapor with elevated levels of volatile organic compounds (VOCs) and methane gas.

B) There are several ongoing State and Federal investigation and remediation projects located within the project limits. These projects include the NYSDEC Meeker Avenue Solvent Plume; the ExxonMobil Greenpoint Oil Spill; the Phelps Dodge Laurel Hill NYSDEC Class 2 Inactive Hazardous Waste Site, and the USEPA listing of Newtown Creek on the Federal National Priority List (Superfund). Summary information for these four sites is contained in the aforementioned May 2012 Contaminated Material Investigation Findings Report. The Design-Builder will be required to maintain an up-to-date understanding of the ongoing investigation and remediation work being performed on these projects and the implications to construction. Publicly available information for these sites is available at local document repositories including Brooklyn Community Board One and the Greenpoint Branch of the NYC Public Library.

C) There are numerous groundwater monitoring wells located across the project site in Brooklyn related to the Greenpoint Oil Spill and the Meeker Avenue Solvent Plume, and in Queens on the Phelps Dodge Inactive Hazardous Waste Site. The Design-Builder is responsible for protecting existing groundwater monitoring wells from damage and providing access to these wells by the responsible parties and regulatory agencies as necessary. At no time will any existing monitoring wells associated with the ongoing investigation and remediation projects be removed or relocated without written permission from NYSDEC.

D) With exception of work within the limits of the Phelps Dodge Laurel Hill Inactive Hazardous Waste Site (see E below), the Design-Builder shall perform all work in accordance with the Contaminant Management Plan (CMP) and Construction Health and Safety Plan (CHASP) provided to the Design-Builder by the Department. These documents have been reviewed by NYSDEC. If the Design-Builder proposes alternative methods to those included in the project's CMP and CHASP, the Design-Builder is required to submit such alternatives to NYSDEC for approval prior to beginning the work. Written approval from NYSDEC of the alternative methods shall be provided to the Engineer prior to start of work.

E) For all intrusive work on the Phelps Dodge Laurel Hill Inactive Hazardous Waste Site, the Design-Builder is required to follow the existing Phelps Dodge Health and Safety Plan for the site. A Site Management Plan (SMP) for the Laurel Hill Site prepared by Phelps Dodge is currently under review by NYSDEC and will be provided to Proposers by Addendum. The Design-Builder will be required to follow the NYSDEC-approved SMP for all work on the Phelps Dodge Laurel Hill Site.

F) Excavated soil shall be managed under Item 205.02 - Segregation and Storage of Contaminated Materials. The Design-Builder shall segregate any suspected grossly contaminated soil from apparent non-contaminated soil as described in Item 205.02. Soil exhibiting photo-ionization detector (PID) readings of 25 parts per million (ppm) or greater, petroleum-staining, unusual odors, or visible contamination will be staged separately for disposal from apparent lesser impacted soils. The soil shall be staged on polyethylene plastic (minimum 10-mil thick) at an agreed upon location for disposal

characterization. While staged, the Design-Builder shall maintain a minimum 6-mil polyethylene cover over the soil pile(s) to prevent water from entering the soil pile. Berms constructed of hay bales, jersey barriers, and/or silt fence shall be constructed around soil piles to prohibit soil runoff from the pile(s).

G) The Design-Builder shall conduct vapor monitoring during all excavation in accordance with Item 205.03 – Field Organic Vapor Monitoring, for the purpose of segregating potentially greater contaminated soil from lesser contaminated soil per Item 205.02.

H) Stockpiled soils shall be characterized for disposal as determined by the results of analytical testing performed by the Design-Builder per Item 205.04 – Laboratory Analysis, and in accordance with all applicable State and Federal Regulations, and meeting disposal facility requirements. After characterization, the Design-Builder shall load the soils into lined trucks and the material shall be transported and disposed of at a NYSDEC (or other state environmental agency) approved facility. Dependent on the waste characterization results, the Design-Builder shall dispose of these soils in accordance with Item 205.0501 – Disposal of Contaminated Hazardous Waste Soil and/or Item 205.0502 – Disposal of Contaminated Non-Hazardous Waste Soil.

I) At no time may excavated soil be reused as backfill at the project site or at other locations without explicit written permission from NYSDEC. Should the Design-Builder obtain NYSDEC approval to reuse excavated soil, this work shall be performed in accordance with Item 205.06 – Reuse of Contaminated Soil.

J) The Design-Builder shall be responsible for handling, treating, discharging and/or disposing of any contaminated water removed from excavations per the Part 5 – Special Provisions – Handling and Treatment of Contaminated Construction Dewatering Fluids. The Design-Builder is responsible for designing, providing and operating a treatment system in compliance with the permit requirements. The Department will provide the Design-Builder with a NYSDEC SPDES Permit for dewatering of excavations in Queens. If the Design-Builder's work necessitates dewatering in Brooklyn or requires changes to the expected dewatering scope in Queens, the Design-Builder is responsible for obtaining additional or modified dewatering discharge permits from NYSDEC.

K) Current plans are to locally dewater the excavations in Queens by sump (trash) pumps. If the Design-Builder elects to install dewatering wells to lower the water table in either Queens or Brooklyn, the Design-Builder is responsible for obtaining a NYSDEC Long Island Well Permit.

L) Driven piles are preferred by NYSDEC to eliminate the generation of contaminated spoils brought to the surface, particularly in Brooklyn in the vicinity of the Greenpoint Oil Spill and Meeker Avenue Solvent Plume. Should the Design-Builder choose an alternative pile method, the Design-Builder must develop methods to contain and dispose of the contaminated soils, and provide written proof to the Department that such methods are acceptable to NYSDEC. Regardless of the type of piles that are selected, the depths of the piles may not extend more than 10 feet above the Raritan Clay confining layer in order to avoid cross contamination of the deeper aquifer.

M) Dredging of Newtown Creek sediment is not expected based on the preliminary design. If the Design-Builder determines that dredging is necessary, the Design-Builder is responsible for obtaining a NYSDEC Dredging Permit. The dredged material would require dredging, handling and offsite disposal as contaminated material. Any dredging or work in general within Newtown Creek will require coordination with USEPA based on the creek's listing on the Federal NPL.

N) The Design-Builder will be responsible for performing Water Quality Monitoring of Newtown Creek per Part 5 Special Provisions – Turbidity Monitoring, and in accordance with all applicable permit requirements.

O) The Design-Builder will be required to take precautions to avoid damage to the underground components of the groundwater remediation system that currently operates on the Phelps Dodge Laurel Hill Inactive Hazardous Waste Site. In addition, the Design-Builder shall take over the maintenance and operation of the Laurel Hill Site Geotechnical and Environmental Instrumentation and Monitoring as described in Section 10.3.9.

P) The Design-Builder will be responsible for providing worker exposure air monitoring for hazardous atmospheres during all ground intrusive activities, including for VOCs, particulates, and methane. The Design-Builder will be responsible for abating any unsafe conditions related to harmful vapors detected during the worker exposure monitoring.

Q) The Design-Builder shall maintain odor control materials onsite at all times and shall institute odor control as necessary and as directed by the Engineer.

R) The Design-Builder shall institute a Community Air Monitoring Plan (CAMP) as described in the provided CHASP and CMP and in accordance with the NYSDOH guidance for developing a CAMP contained in NYSDEC DER-10: Technical Guidance for Site Investigation and Remediation. Prior to any ground intrusive work or structure demolition, the Design-Builder shall submit to the Engineer and NYSDEC for approval a detailed site specific CAMP. No ground intrusive or demolition work may commence until written proof of NYSDEC acceptance of the CAMP is provided to the Engineer. Based on the results of the CAMP monitoring, the Design-Builder shall be responsible to modify work actions as needed to maintain acceptable air quality throughout operations. Work activities shall at all times be performed to minimize the generation of dust.

S) The Design-Builder will provide the Engineer with copies of all analytical test data and disposal documentation as soon as feasible but not to exceed the timeframes stipulated under the specifications.

T) All employees involved in contaminated material work related to the project must be properly trained as identified in OSHA Standard 29 CFR 1910.120. This includes all individuals involved in all portions of the work, including managing, supervising, designing, inspecting or performing the work.

U) The Design-Builder shall provide the Engineer with a complete set of record documents, including chain-of-custody records, worker sign in/out sheets, proof of worker training, results of daily monitoring, manifests and disposal record documents and other such records as requested by regulations and specifications and within the time frame required within the specifications.

V) The Design-Builder will be responsible for proper abatement and disposal of all hazardous and contaminated materials contained in the buildings to be demolished, including but not limited to asbestos, tanks, drums, containers, and universal waste.

W) The Design-Builder will be responsible for preparing all work plans and reports required by the Specifications and CMP, including but not limited to, an Environmental Sampling and Analysis Plan, an Environmental Sampling Quality Assurance Project Plan, a Waste Management Plan, a Water Quality Monitoring Plan, a CAMP, and a Final Closure Report. The Final Closure Report must contain a certification from a Professional Engineer licensed in the State of New York that the Project's CMP has been followed. The Final Closure Report shall include at a minimum:

- All final executed waste disposal manifests and the corresponding weight ticket from the receiving facilities;
- The results of all analytical testing performed for the project;
- A Tank Closure Report for all underground and aboveground petroleum storage

tanks that are removed during construction, along with copies of any PBS Modification Forms that are required;

- A summary of the final volumes of soil removed from the project site for offsite disposal, volume of soil excavated and reused on the project site as backfill, and the final volume of imported fill;
- Documentation of soil import sources and export locations;
- Laboratory results for soil imported to the project site, for soil reused on the project site (if pre-approved by NYSDEC), and soil exported for beneficial reuse elsewhere (if pre-approved by NYSDEC) will require a NYS ASP Category B Data Deliverable and will require a Third Party Data Usability Report;
- A Final Engineering Report for the site cap constructed on the Phelps Dodge parcels that includes As-Built Drawings certified by a Professional Engineer licensed in the State of New York; and
- Plans showing the locations where a) soil was removed from the site, b) locations where soil excavated from the project site was reused on the project site (if any), and c) the locations where imported fill is placed.

3.2.6 Environmental Plans

3.2.6.1 Environmental Compliance Plan

The Design-Builder shall further develop the Initial Environmental Compliance Plan submitted with its Proposal, implement the Plan and update it as necessary throughout the duration of the Project. The Environmental Compliance Plan shall detail the Design-Builder's measures and procedures to ensure compliance with all EPCs, as well as compliance with all other Environmental Requirements.

A fully developed version of the Environmental Compliance Plan shall be submitted prior to the start of construction for consultation and written comment by the Department.

At a minimum, the Environmental Compliance Plan shall include the following elements:

A) Environmental team

- 1) Environmental personnel: names, titles and Project responsibilities, training, years of relevant experience, licensing and applicable training; and
- 2) Environmental team organization.

B) Environmental compliance tracking and reporting procedures

- 1) Process meetings and reporting requirements, including purpose and frequency of reports;
- 2) Environmental compliance schedule;
- 3) Method of reporting emergencies and alleged violations of Environmental Requirements to the Department of; and
- 4) QA/QC procedures for environmental compliance; and

C) Environmental Approvals

- 1) Identify any increase in environmental impacts associated with the Design-Builder's design that are greater than those disclosed in the Project environmental permits or other Environmental Requirements. Identify all additional permits and Environmental Approvals required for implementation of the Design-Builder's design; and

2) Describe the Design-Builder's plan to obtain all additional permits and Environmental Approvals identified and how they fit into the Design-Builder's schedule.

3.2.6.2 Other Environmental Plans

The Design-Builder shall be responsible for preparing the following documents, and all other required documents, in conformity with all Environmental Requirements. In each of the documents listed below, the Design-Builder shall identify the frequency of submission of compliance reports to the Department.

- A) Spill Prevention, Control, and Countermeasures (SPCC) Plan;
- B) Construction Noise Control Plan;
- C) Rodent Control Plan;
- D) Lead Compliance Plan;
- E) Stormwater Pollution Prevention Plan (SWPPP) (Draft provided by the Department, the Design Builder is responsible for updating as necessary, obtaining final approval and implementing);
- F) Project-Generated Waste Management Plan.

3.3 ENVIRONMENTAL APPROVALS

The Environmental Approvals required for the Project as it is scoped in the RFP as well as the current status are listed in Table 3.4-1. This list may not be comprehensive and the Design-Builder is responsible to obtain all approvals as needed for the Project.

Updates to the status of Environmental Approvals will be provided by the Department by Addenda.

Table 3.3-1 – Environmental Approvals/Permits and Status

Issuing Agency	Permit/Process/Approval	Status
US Coast Guard	General Bridge Act of 1946 33CFR 525: bridge permit.	Permit application submitted 8/27/12.
USACE	Permit authorization will meet the requirements of Section 404 of the Clean Water Act (33 USC 1251-1387) and Section 10 of the Rivers and Harbors Act of 1899. Anticipate authorization under Nationwide Permit No. 15 US Coast Guard Approved Bridges	Permit application submitted on 8/20/12. Permit application acknowledged by the USACE on 1/4/13.

Table 3.3-1 – Environmental Approvals/Permits and Status

Issuing Agency	Permit/Process/Approval	Status
USFWS	Endangered Species Act (ESA) (16 USC §§1531-1544; 50 CFR Part 402)	Per the 5/22/02 and 1/24/05 correspondence between NYSDOT and USFWS, except for transient individuals, no known federally listed threatened or endangered species are known to exist in the project area.
	Fish and Wildlife Coordination Act (FWCA)	FWCA recommendation issued in 5/15/07 letter from NOAA to NYSDOT.
NOAA – NMFS	Endangered Species Act (16 USC §§1531-544; 50 CFR Part 402)	NOAA letter dated 8/18/2005 states that no federally listed threatened or endangered species are present at the project site and no further consultation under Section 7 of the Endangered Species Act is necessary (page IV-79 of the EIS).
	Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§ 1801-1884)	EFH submitted with August 20, 2012 Permit Application. Awaiting approval of EFH. EFH conservation recommendations issued in 5/15/07 letter from NOAA to NYSDOT.
NYSDEC	Tidal Wetlands Law (ECL, Article 25)	Permit has been issued by NYSDEC.
	The Protection of Water (ECL, Article 15)	Permit has been issued by NYSDEC.
	Excavation and fill in navigable waters	Permit has been issued by NYSDEC.
	Section 401 of the Clean Water Act Water Quality Certification	Permit has been issued by NYSDEC.

Table 3.3-1 – Environmental Approvals/Permits and Status

Issuing Agency	Permit/Process/Approval	Status
NYS OPRHP/ SHPO	National Historic Preservation Act (NHPA) (16 USC §470A; 36 CFR Part 800)	MOA signed 10/22/08. Revised APE, AWP and CPP submitted 2/27/13 and SHPO concurrence received on 3/26/2013 and 3/27/2013
FHWA/NYS DOT	National Environmental Policy Act (42 USC Section 4321 et seq.) and 23 CFR Part 771	ROD signed 3/9/09 (FHWA). Re-evaluation Statement approved June 2011 (FHWA/NYS DOT).
	New York State Environmental Quality Review Act (SEQR)	ROD issued March 9, 2009 (EIS satisfies NEPA and SEQR)
	Section 4(f) evaluation	Included as part of the FEIS.
	23 CFR 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise	Noise mitigation measures per the Record of Decision
	EO 11990 Wetland Finding	Included as part of the FEIS.
	EO 11988 Floodplain Management	Included as part of the FEIS.
NYSDOS	Coastal Zone Consistency Determination	Consistency Determination (General Concurrence) issued on 2/12/2013
NYCDCP	Coastal Zone Consistency Determination	Consistency Determination (General Concurrence) issued on 2/12/2013
NYCDCP	ULURP Application	In progress by the Department

3.4 DELIVERABLES

At a minimum, the deliverables shall include the items listed in Table 3.5-1 for the Department's consultation and written comment.

Each of the deliverables listed in Table 3.5-1 shall be provided to the Department by the earlier of: (i) 120 days after NTP; and (ii) 30 days prior to the relevant on site activity, including start of construction. Any other needed Environmental document shall be delivered in a timely manner to allow for Department review.

Table 3.4-1 – Deliverables

Deliverable	Number of Copies		Reference Section
	Hardcopy	Electronic	
Environmental Compliance Plan	3	1	3.2.6.1

Table 3.4-1 -- Deliverables

Deliverable	Number of Copies		Reference Section
	Hardcopy	Electronic	
Contaminant Management Plan (Draft provided by the Department)	3	1	3.2.5
Construction Noise Control Plan	3	1	3.2.2
Construction Health and Safety Plan (Draft provided by the Department)	3	1	3.2.5
Rodent Control Plan	3	1	3.2.6.2
Lead Compliance Plan	3	1	3.2.6.2
Stormwater Pollution Prevention Plan (Draft provided by the Department)	3	1	3.2.6.2
Project-Generated Waste Management Plan	3	1	3.2.6.2

Refer also to:

SECTION 1.10 ENVIRONMENTAL RE-EVALUATION

SECTION 18 VISUAL QUALITY

Clause Code:	022-ROW-01
Clause Type:	Right of Way
Project Name:	Route 29/Charlottesville Bypass Project
Owner Name:	Virginia DOT
Year Published:	2011

REQUEST FOR PROPOSALS

4.3 Attachments to the Letter of Submittal # 1

4.3.1 Provide the following Attachments to the Letter of Submittal #1:

<Omitted>

4.3.1.6 Exhibit No. 6. Offeror shall provide the identity of and information about the Key Personnel listed below. This information is to be provided on the Key Personnel Resume Form attached hereto as Attachment 4.3.1.6. Included with such information shall be full size copies of individual registrations/licenses/certifications from appropriate governmental bodies as required below. For each Key Personnel practicing or offering to practice professional services in Virginia, the Successful Offeror shall provide the DPOR registration number and the expiration date for such Key Person and the office

<Omitted>

(k) Right of Way Manager – This individual shall be responsible for coordinating all right-of-way acquisition services. The Right of Way Manager will ensure that the acquisition process is in compliance with all applicable laws and regulations.

Licensure/Certification/Training Requirements: This individual shall be from a firm that is a member of VDOT's prequalified right-of-way contracting consultants

TECHNICAL INFORMATION AND REQUIREMENTS

1.0 DESIGN-BUILDER'S SCOPE OF WORK

1.3 Anticipated Design Services

The Design-Builder shall develop Preliminary Design-Build Plans, Final Right-of-Way Plans (for the northern and southern termini) and Final Construction Plans for mainline, the northern terminus, and the southern terminus to stay within the limits of existing and proposed R/W as presented on Exhibit A, as prepared by Parsons Brinckerhoff, dated September 23, 2011. The Design-Builder shall provide Final Right-of-Way Plans and plats for any necessary modifications to Leonard Sandridge Road.

The Design-Builder will be responsible for obtaining detailed survey and mapping necessary for Project final design in Imperial units and in MicroStation CAD platform in accordance with the current VDOT Survey Manual. The Design-Builder will be responsible for any conversion necessary for the right-of-way points for referencing into the imperial plans and for staking the metric right-of-way and easements on the ground.

<Omitted>

1.6 Anticipated Right-of-Way Services

Most real property interests, including rights-of-way and all easements both temporary and permanent, for the Project limits south of the South Fork of the Rivanna River, as depicted on Exhibit A (included in the RFP Information Package), have been secured by VDOT.

Exceptions to current ownership in that area are: the state property portion of the University of Virginia (Rectors) property located adjacent to existing Route 29/250, and parcels 015/025, 024, 041, 042, 100/102 & 145/147.

The Design-Builder, acting as an agent on behalf of the Commonwealth of Virginia, shall provide all remaining right-of-way acquisition services for the Project for right-of-way and easements both temporary and permanent, including survey plats for each impacted parcel, for the Project limits north of the South Fork of the Rivanna River and the properties listed in the preceding paragraph, south of the South Fork of the Rivanna River. VDOT must issue a Notice to Commence Right-of-Way acquisition prior to any offers being made to acquire property. Similarly, VDOT must issue a Notice to Commence Construction once the property has been acquired prior to commencing construction on the property. The Design-Builder will not be responsible for the actual cost of the purchase of right-of-way, all easements, and miscellaneous fees associated with closing as part of the Project. All Right-of-Way acquisition costs (compensation paid to landowners for right-of-way or easements) will be paid by VDOT, and shall not be included in the Offerors Price Proposal.

Design-Builder's proposed design shall not exceed the proposed right-of-way limits indicated on Exhibit A.

Prior to completion, the Design-Builder shall provide and set appropriate VDOT right-of-way monuments within the Project limits.

Also refer to:

1.4 Anticipated Environmental Services

1.5 Anticipated Utility Services

1.7 Anticipated Construction Services

Clause Code:	023-ROW-02
Clause Type:	Right of Way
Project Name:	US 90 (I-49 South) Albertson's Parkway to Ambassador Caffery Design-Build Project
Owner Name:	Louisiana DOT
Year Published:	2013

PART 3 - DESIGN REQUIREMENTS AND PERFORMANCE SPECIFICATIONS

APPENDIX A

RIGHT-OF-WAY ACQUISITION PERFORMANCE SPECIFICATION

1.0 INTRODUCTION

The Design-Builder shall provide all Right-of-Way (ROW) acquisition services necessary for the Project. Through the course of final design efforts the Design-Builder will identify the parcels to be acquired and will be responsible for the activities needed to secure the necessary right-of-way. The LA DOTD will retain final authority for approving just compensation, relocation benefits, and settlements. LA DOTD will retain the expropriation authority. The LA DOTD is not aware of any issues related to the Right-of-Way (ROW) and has not acquired any ROW for the purposes of this project. The ROW Manager for this project is Mr. Robert Richard or his representative with the District 03 Real Estate office.

If necessary the Design-Builder shall submit an acquisition and relocation procedure (see LA DOTD ROW Manual) prior to acquiring ROW

- A) Title 23 United States Code (Highways)
- B) Title 49 United States Code (Transportation) Part 24
- C) Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended
- D) Title 9 Title 19 Title 38 Title 48 Louisiana Civil Code
- E) Louisiana Constitution Article I, Section 4
- F) Louisiana Constitution Article VI, Section 21
- G) Louisiana Constitution Article VII, Section 14
- H) Louisiana A

2.0 PERFORMANCE GOALS

- A) Design and construct the project to minimize the necessity to purchase real property outside existing right-of-way.
- B) Should additional right-of-way be required, ensure that property acquisition services are performed in a timely manner to avoid delays in the projects critical path.
- C) Right-of-way acquisition performed in accordance with the Uniform Relocation and Real Property Acquisition Act of 1970, as amended and all other applicable State and Federal requirements.

3.0 STANDARDS AND REFERENCES

Standards and references specifically cited in the body of this Right-of-way Acquisition Performance Specification establish LA DOTD's Standards and suggested Reference guidelines. Should the requirements in any standard or reference conflict with those in

another, the standard or reference highest on the lists presented below shall govern. Listed under References are guidelines that the Design-Builder may use in addressing the project requirements as he deems appropriate. It is the Design-Builder's responsibility to obtain clarification of any unresolved ambiguity prior to proceeding with design or construction.

3.1 STANDARDS

- A) Title 23 United States Code (Highways)
- B) Title 49 United States Code (Transportation) Part 24
- C) Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended
- D) Title 9 Title 19 Title 38 Title 48 Louisiana Civil Code
- E) Louisiana Constitution Article I, Section 4
- F) Louisiana Constitution Article VI, Section 21
- G) Louisiana Constitution Article VII, Section 14
- H) Louisiana Administrative Code Chapter 70

3.2 REFERENCES

- A) Operations Manual; LA DOTD, Office of Right Of Way
- B) Title Research Manual; LA DOTD, Office of Right-Of-Way
- C) LA DOTD ROW Manual

4.0 REQUIREMENTS

The Design-Builder shall perform the following services should ROW acquisition be necessary for the successful completion of the Work.

Within 60 days from notice-to-proceed, the Design-Builder will prepare and submit a ROW Acquisition Service Plan for the LA DOTD's review and approval. The ROW Acquisition Service Plan will be in accordance with Title 23 CFR Part 710.313 (d)(i) which includes in part a detailed organizational chart showing the individuals who will be providing the right-of-way acquisition services, a written description of the Design-Builder's approach to acquiring the necessary ROW for the project, a flow chart of the step-wise activities/process needed, a Gantt Chart schedule showing the anticipated start/durations/finish for the activities, providing reasonable timeframes for the orderly relocation of residences and businesses and any other information that the Design-Builder deems necessary to adequately describe their ROW acquisition process. The Design-Builder shall provide assurance to the LA DOTD that necessary ROW has been acquired prior to beginning physical construction on the acquired parcels. In accordance with Title 23 CFR Part 710.313 (d) (2i) the Design-Builder shall establish a project tracking system, showing appraisal, acquisition and relocation status of all parcels.

The Design-Builder's right-of-way acquisition activities will include but not be limited to the following:

- A) Title Research Reports** – Title research reports shall be performed by a Design-

Builder listed on the DOTD Real Estate Section's approved title work panel list and shall consist of obtaining the necessary title research reports. The term "Title Research Report" is defined as a report of the ownership of the current property owner(s) with addresses, acquisition data, assessment and tax information, description of the property, conveyances of full ownership, conveyances of other rights (servitudes, leases, restrictions, etc.), existing right-of-way, recorded plats, and copy of the last acquisition. One title research report shall be obtained for each parcel. The original and three paper copies and one electronic copy of the title research reports shall be furnished to the LA DOTD Project Manager along with the final right-of-way map submittal, for forwarding to the Real Estate Section.

B) Property Survey – Shall consist of all investigations, studies, and field property surveys required for the preparation of a base right-of-way map. The field property survey shall be based on the same survey control as the topographic survey. Upon completion of the property survey, the Design-Builder shall notify the LA DOTD Project Manager, in writing, and provide an electronic text file listing coordinates and descriptions of all found monuments, a "PDF" copy of all documents (plats, maps, etc.) used to determine property line locations and a "PDF" copy of title takeoffs or title research reports used to determine property line locations. The Design-Builder shall also provide a sketch in MicroStation and "PDF" formats showing all surveyed property lines and existing right of way with ties to project centerline.

C) Title Updates – Shall consist of obtaining updates of the originally acquired title research reports, if the reports are more than six months old. These updates shall be used in the preparation of the final right-of-way maps and also by the LA DOTD's Real Estate Section in acquiring title to the property required for the construction project.

D) Right-of-Way Maps – Shall consist of all services required to complete the base and final right-of-way maps, described more specifically as follows: The base right-of-way map shall show the adopted project centerline, all existing right-of-way, limits of construction, appropriate topography (residences, commercial buildings, structures, etc.), parcel line locations and ownerships, and required taking lines, with ties to the adopted project centerline. Individual parcel metes and bounds and precise area calculations are not required at this time, however, the approximate area of each required parcel and remaining area shall be determined and shown on the base map. These maps shall be in the same standard format and shall form the basis for the final right-of-way map.

Specifically, this work shall be performed in accordance with all principles and objectives set forth in the latest issue of the DOTD's Location and Survey Manual, although currently acceptable surveying standards and methods, as approved by the Location and Survey Administrator, may be used. For purposes of a joint review meeting, the base right-of-way map along with one copy of each of the title reports used in preparation of the base right-of-way map, shall be furnished at approximately 60% completion, and reviewed by a DOTD Team. Appropriate revisions recommended for inclusion in the final right-of-way map shall be addressed by the Design-Builder. The final right-of-way map preparation shall include all activities necessary to complete the final right-of-way map and shall be performed in accordance with the requirements specified in the latest issue of the DOTD's Location and Survey Manual. The final right-of-way map shall be the base right-of-way map as described above, and shall also include all revisions recommended by the Joint Review Team, parcel metes and bounds, parcel acquisition

blocks, parcel areas, remaining areas, Lambert coordinates of all breaks in the required right-of-way and P.C.'s and P.T.'s of curves, and shall be accompanied by an electronic file containing the DOTD COGO program input commands for creating parcel descriptions suitable for use by the DOTD's Real Estate Section.

E) Title Take-Off – A report of the deed of ownership of the current property owner, and all survey documents, (plats, maps, etc.) associated with the current ownership deed. One title take-off may be obtained for each parcel, if necessary, to expedite commencement of field work. The title take-off is not considered a part of the title research report and may be performed by the surveyor.

F) Appraisals – The Design-Builder shall select appraisers to perform the appraisal services from the DOTD Real Estate Section's list of approved appraisers. The appraisal must consider all relevant and reliable approaches to value consistent with established Federal and federally assisted program appraisal practices. If the appraiser uses more than one approach, there shall be an analysis and reconciliation of approaches to value used that is sufficient to support the appraiser's opinion of value; it must include a description of comparable sales, including description of all relevant physical, legal, and economic factors such as parties to the transaction, source and method of financing, and verification by a party involved in the transaction. The appraisal must also include a statement of the value of the real property to be acquired and, for a partial acquisition, a statement of the value of the damages and benefits, if any, to the remaining real property, where appropriate and the effective date of valuation;

5.0 PERFORMANCE MEASURES

The Design-Builder's performance will be equally measured by the following:

- A) A design that fulfills project goals while minimizing the acquisition of additional right-of-way.
- B) Timeliness of acquisitions relative project critical path.
- C) Amicability of all acquisitions; avoidance of expropriations.
- D) Ability to document all work appropriately.
- E) Ability to interact with real property owners in a positive, professional manner.

Clause Code:	024-UR-01
Clause Type:	Utility relocation
Project Name:	Route 29/Charlottesville Bypass Project
Owner Name:	Virginia DOT
Year Published:	2011

4.3 Attachments to the Letter of Submittal # 1

4.3.1 Provide the following Attachments to the Letter of Submittal #1:

<Omitted>

4.3.1.6 Exhibit No. 6. Offeror shall provide the identity of and information about the Key Personnel listed below. This information is to be provided on the Key Personnel Resume Form attached hereto as Attachment 4.3.1.6. Included with such information shall be full size copies of individual registrations/licenses/certifications from appropriate governmental bodies as required below. For each Key Personnel practicing or offering to practice professional services in Virginia, the Successful Offeror shall provide the DPOR registration number and the expiration date for such Key Person and the office

<Omitted>

(h) **Lead Utility Engineer** – This individual should serve as the lead utility engineer for the Project, responsible for utility design of in-plan utilities and the coordination of all utility relocations. The Lead Utility Engineer shall be available to review designs and to verify and modify designs, if necessary, based on field conditions and construction activities.

<Omitted>

2.16 Utilities

The Design-Builder shall be responsible for coordination of the Project construction with all utilities that may be affected. The Design-Builder shall be responsible for coordinating the work of the Design-Builder, its subcontractors and the various utilities. Such coordination shall be formally executed through a Utility Communications Plan. The Utility Communications Plan shall be developed by the Design-Builder and submitted to the VDOT Project Manager within 30-days of the Date of Commencement. The Design-Builder shall designate a Utility Relocation Coordinator, who shall have a minimum of two (2) years' experience in coordinating utility relocation in accordance with Federal Regulations (23CFR30, Part 645) and policies and procedures outlined in VDOT's Utility manual. The designee shall be subject to VDOT's approval. The Design-Builder's Utility Relocation Coordinator shall be responsible for carrying out the Utility Communication Plan and all interactions with the utility companies.

The resolution of any conflicts between utilities and the construction of the Project shall be the responsibility of the Design-Builder. No additional compensation or time will be granted for any delays, inconveniences, or damage sustained by the Design-Builder or its subcontractors due to interference from utilities, utility owners or the operation of relocating utilities. Additionally, the Design-Builder is solely responsible for any schedule delays due to additional utility relocation associated with the Design-Builder's design changes and no time extensions will be granted.

The Design-Builder shall be responsible for utility designations, utility locates (test holes),

conflict evaluations, cost responsibility determinations, utility relocation designs, utility relocations and adjustments, utility reimbursement, replacement land rights acquisition required outside of the easements shown on Exhibit A and any north of the South Fork of the Rivanna River, and utility coordination required for the Project. The Design-Builder shall be responsible for all necessary utility relocations and adjustments to occur in accordance with the accepted Baseline Schedule. All efforts and cost necessary for utility designations, utility locates (test holes), conflict evaluations, cost responsibility determination, utility relocation designs, utility relocations and adjustments, utility reimbursements, and utility coordination shall be included in the Offerors Price Proposal provided, however, if the VDOT Project Manager agrees that utilities cannot be relocated within existing or proposed right-of-way to construct the project as depicted in Exhibit A, the compensation paid to landowners for replacement land rights will be paid by VDOT as part of right-of-way acquisition costs and shall **NOT** be included in the Offerors Price Proposal.

The Design-Builder shall make all reasonable efforts to design the Project to avoid conflicts with utilities, and minimize impacts where conflicts cannot be avoided.

The Design-Builder shall initiate early coordination with all utilities located within the Project limits. The Design-Builder shall identify and acquire any replacement utility easements needed for all utilities necessary for relocation due to conflicts with the Project including all utility easements.

The Design-Builder shall provide all utilities with roadway design plans as soon as the plans have reached a level of completeness adequate to allow them to fully understand the Project impacts. The utility will use the Design-Builder's design plan for preparing relocation plans and estimates. If a party other than the utility prepares relocation plans, there shall be a concurrence box on the plans where the utility signs and accepts the relocation plans as shown.

The Design-Builder shall coordinate and conduct a preliminary review meeting with all affected utility owners to assess and explain the impact of the Project. VDOT's Project Manager and Regional Utilities Manager (or designee) shall be included in this meeting.

The Design-Builder shall verify the prior rights of each utility's facilities if claimed by a Utility owner. If there is a dispute over prior rights with a utility, the Design-Builder shall be responsible for resolving the dispute. The Design-Builder shall prepare and submit to VDOT a Preliminary Utility Status Report within 120 days of the Date of Commencement that includes a listing of all utilities located within the Project limits and a conflict evaluation and cost responsibility determination for each Utility. This report shall include copies of easements, plans, or other supporting documentation that substantiates any compensable rights of the utilities. The Design-Builder shall obtain the following from each utility that is located within the Project limits: relocation plans including letter of "no cost" where the utility does not have a compensable right; utility agreements including cost estimate and relocation plans where the utility has a compensable right; letters of "no conflict" where the utility's facilities will not be impacted by the Project.

Design-Builder shall review all relocation plans to ensure that relocations comply with the VDOT Utility Manual and VDOT's Land Use Permit Regulations. The Design-Builder shall also ensure that there are no conflicts with the proposed roadway improvements, and ensure that there are no conflicts between each of the utility's relocation plans. The Design-Builder shall prepare and submit all relocation plans to VDOT for approval. The Design-Builder shall assemble the information included in the relocation plans in a final and complete form and in such a manner that VDOT may approve the submittals with minimal review. The Design-Builder shall meet with VDOT's Regional Utilities Manager (or designee) within 45 days of the Date of Commencement to gain a full understanding of what is required with each submittal. The Design-Builder shall receive written approvals from VDOT prior to authorizing utilities to commence relocation construction. The utilities shall not begin their relocation work until authorized by the Design-Builder. Each relocation plan submitted shall be accompanied by a certification from the Design-Builder stating that the proposed relocation will not conflict with the proposed roadway improvement and will not conflict with another utility's relocation plan.

At the time that the Design-Builder notifies VDOT that the Design-Builder deems the Project to have reached Final Completion, the Design-Builder shall certify to VDOT that all utilities have been identified and conflicts have been resolved and that those utilities with compensable rights or other claims related to relocation or coordination with the Project have been relocated and their claims and compensable rights satisfied or shall be satisfied by the Design-Builder.

The Design-Builder shall accurately show the final location of all utilities on the as-built drawings for the Project.

It is the Design-Builder's responsibility to verify whether other utility owners exist within the project limits. Known utility owners and their respective contact numbers are identified below for reference only and may not be limited to the following:

<Omitted>

Clause Code:	025-UR-02
Clause Type:	Utility Relocation
Project Name:	I-15 Cajon Pass Rehabilitation Design-Build Project
Owner Name:	California DOT
Year Published:	2013

6 ACCESS TO SITE; UTILITY RELOCATIONS; ENVIRONMENTAL MITIGATION

<Omitted>

6.2 Utility Relocations

This Section 6.2 describes how the risk of increased costs and delays associated with the Utility Work is allocated between Department and Design-Builder through the Change Order process, and contains certain additional terms relating to Utility Work to supplement those set forth in Section 6 of Book 2. Design-Builder agrees that (a) the Contract Price covers all of the Relocations and other Utility Work to be furnished or performed by Design-Builder described in Section 6 of Book 2 and in this Section 6.2, and (b) it is feasible to obtain and/or perform all necessary Utility Work within the time deadlines of the Contract Documents. Accordingly, Design-Builder shall be entitled to receive a Change Order for additional costs and delays associated with the Utility Work only as permitted by this Section 6.2 or in circumstances for which such a Change Order is otherwise permitted under Section 13 (such as for Department-Directed Changes which increase the Utility Work to be furnished or performed by Design-Builder). A deductive Change Order for reductions in the Utility Work to be furnished or performed by Design-Builder shall be issued only when permitted by this Section 6.2 or in circumstances for which a deductive Change Order is otherwise permitted under Section 13.

Notwithstanding the foregoing, Design-Builder's entitlement to any Change Orders pursuant to Section 13 relating to the Utility Work shall be subject to any applicable limitations and restrictions set forth in this Section 6.2, and Design-Builder's entitlement to any Change Orders pursuant to this Section 6.2 shall be subject to the limitations, restrictions and procedures set forth in Section 13, except as otherwise set forth in Section 6.2.8.

6.2.1 Accuracy of Design and Data

6.2.1.1 “Reasonable Accuracy” Defined

6.2.1.1.1 Reasonable Accuracy

For purposes of Sections 6.2.1.1 and 6.2.1.2, a Utility shall be deemed indicated with reasonable accuracy if:

- (a) with respect to the “Quality Level A” Utility information provided by Department (as indicated therein), the Utility’s actual location is within 2 feet of the indicated horizontal and vertical locations at the “xyz” coordinates in the utility plan sheets or pothole matrices showing Verified Utility Information in Book 2; or
- (b) with respect to the “Quality Level B” Utility information provided by Department (as indicated therein), the Utility’s actual location is within 2 feet of the indicated horizontal location at the “xy” coordinates in the utility plan sheets or pothole matrices showing Verified Utility Information in Book 2 (with no limitation on vertical location).

6.2.1.1.2 Inconsistency Among Verification Data Sheets

If there is any inconsistency between any two or more utility plan sheets or pothole matrices showing Verified Utility Information cited in Section 6.2.1.3.1, the most accurate of the indications will be used for purposes of Section 6.2.1.3.1.

6.2.1.1.3 Design-Builder Acknowledgment Regarding RID

Design-Builder acknowledges that statements in the RID as to the extent or nature of the work required to Relocate any Utility shall have no relevance to the determination of reasonable accuracy,

and shall not be considered in calculating the amount of the Change Order, if any, to which either party is entitled pursuant to this Section 6.2.1.

6.2.1.2 Inaccuracy Increasing the Work

In general, if any existing underground Utility identified in Book 2, Section 6.2 as part of the Work (or any portion of such Utility) is not indicated at all in the utility plan sheets or pothole matrices showing Verified Utility Information provided in Book 2 or is not indicated therein with “reasonable accuracy” (as defined in Section 6.2.1.1) therein, then, upon Design-Builder’s fulfillment of all applicable requirements of Section 13, and subject to the limitations contained therein, Department shall be responsible for, and agrees to issue a Change Order to (a) compensate Design-Builder for additional costs of the Utility Work (other than Betterments added to the Work pursuant to Section 6.2.4) to be furnished or performed by Design-Builder which are directly attributable to such lacking or incorrect information and/or (b) to extend the Completion Deadlines as a result of any delay in the Critical Path caused by any such conditions. Notwithstanding the foregoing, Design-Builder shall be responsible for, and no Change Order shall be issued under this Section 6.2.1.1 with respect to:

- (i) any Utility (or portion thereof) which a surface inspection of the area would have shown the existence or the likelihood of existence thereof in the correct location and/or size, as applicable, by reason of above-ground facilities such as buildings, meters, junction boxes or identifying markers;
- (ii) Stormwater facilities connected with drainage of the roadway;
- (iii) Department-owned facilities;
- (iv) Service Lines; or
- (v) any costs or delays associated with the performance of Incidental Utility Work by Design-Builder or by any Utility Owner.

6.2.1.3 Inaccuracy Decreasing the Work

If any existing underground Utility identified in Book 2, Section 6 as part of the Work (or any portion of such Utility) is not indicated with “reasonable accuracy” in the utility plan sheets or pothole matrices showing Verified Utility Information provided in Book 2, then Department shall have the right to issue a Change Order reducing the Contract Price and/or Completion Deadlines to reflect the value of any reduction in the costs and/or duration of the Utility Work (other than Betterments added to the Work pursuant to Section 6.2.4) to be furnished or performed by Design-Builder which is directly attributable to the correction of such information. The amount of any such Change Order shall be determined in accordance with Section 13.

6.2.1.4 Partial Inaccuracy

If only a portion of an existing underground Utility identified in Book 2, Section 6.2 is not indicated at all in the utility plan sheets or pothole matrices showing Verified Utility Information provided in Book 2 or is not indicated with “reasonable accuracy” therein, then a Change Order pursuant to Sections 6.2.1.2 or 6.2.1.3 shall be allowed only for the resulting increased or decreased costs (respectively) of the Utility Work incurred by Design-Builder with respect to that portion of such Utility (subject, in the case of any increase in the Contract Price, to the restrictions set forth in clauses (i), (ii), (iii), (iv), and (iv) of Section 6.2.1.1).

6.2.2 Change in Allocation of Responsibility

6.2.2.1 Change in Allocation of Responsibility Increasing the Work

The scope of the Work with respect to Utilities may be increased by reallocating Utility Work from a Utility Owner to Design-Builder by Change Order.

Upon Design-Builder’s fulfillment of all applicable requirements of Section 13, and subject to the

limitations contained therein, Design-Builder shall be entitled to an increase in the Contract Price to compensate Design-Builder for its additional costs directly attributable to any increase in the scope of the Work pursuant to this Section 6.2.2.1; provided, however, that if Department determines in its sole discretion that Department is entitled to reimbursement by the Utility Owner for the cost of such Relocation, then the amount of such resulting increase in the Contract Price shall instead be determined in the same manner as that provided in Section 6.2.4 for a Betterment, subject to the requirements of any applicable Utility Agreement. Design-Builder is responsible for scheduling all Utility Work so as to meet all applicable Completion Deadlines, without regard to whether such Utility Work is performed by Design-Builder or the affected Utility Owner; accordingly, Design-Builder shall not be entitled to an extension of any Completion Deadline on account of any increase in the scope of the Work pursuant to this Section 6.2.2.1. Any increase in the scope of the Work pursuant to this Section 6.2.2.1 shall not be considered a Department-Directed Change.

6.2.2.2 Change in Allocation of Responsibility Decreasing the Work

Any Utility Work initially included in the scope of the Work may be deleted from the scope of the Work pursuant to either of the following:

- (a) The scope of the Work may be reduced pursuant to Book 2, Section 6.2.1; or
- (b) Upon Approval or direction by Department, design and/or construction of Utility Relocations identified in Book 2, Section 6.2 or Incidental Utility Work may be removed from the Work.

Department shall be entitled to a reduction in the Contract Price to reflect any reduction in the scope of the Work pursuant to this Section 6.2.2.2. The amount of any such deductive Change Order shall be determined in accordance with Section 13. Any reduction in the scope of the Work pursuant to this Section 6.2.2.2 shall not be considered a Department-Directed Change

6.2.3 Added Utility Work

Upon Design-Builder's fulfillment of all applicable requirements of Section 13, and subject to the limitations contained therein, Design-Builder shall be entitled to (a) an increase in the Contract Price to compensate Design-Builder for its additional costs and/or (b) an extension of the applicable Completion Deadlines as the result of any delay in the Critical Path directly attributable to any Utility Work added after the Proposal Due Date in accordance with Book 2, Section 6.2.2.1.2.

<Omitted>

6.2.5 Utility Delays

Design-Builder shall give written notice to Department of any circumstance which may lead to a claim under this Section 6.2.5 immediately after Design-Builder becoming aware that such circumstance has occurred or is likely to occur.

6.2.5.1 Allocation of Risk of Schedule Impacts

Design-Builder shall bear the risk of schedule impacts associated with the first four Days of Utility Delays per Utility Owner for the Project. Subject to the limitations and conditions set forth herein, if aggregate Utility Delays caused by a particular Utility Owner exceed four Days, then any Completion Deadline(s) affected thereby shall be extended for one Day for every Day of Utility Delay caused by such Utility Owner in excess of the initial aggregate of four Days of Utility Delay caused by such Utility Owner so long as the Utility Delay impacts the Project's Critical Path.

Failure of the parties to reach agreement regarding Design-Builder's entitlement to an extension due to Utility Delays shall be a Dispute to be resolved in accordance with Section 19. Design-Builder shall not be entitled to any extension of any Completion Deadline on account of any Utility Delay except as provided in this Section 6.2.5.1.

6.2.5.2 Conditions to Extensions for Utility Delays

With respect to each Utility Delay claimed by Design-Builder, Design-Builder shall not be entitled to any extension of any Completion Deadline(s) pursuant to Section 6.2.5.1, and such Utility Delay shall not be counted toward the four-Day cap on Design-Builder's risk per Utility Owner set forth in Section 6.2.5.1, unless all of the following conditions are satisfied:

- (a) Design-Builder has provided evidence reasonably satisfactory to Department that (i) Design-Builder has fulfilled its obligation under the applicable Utility Agreement(s) to coordinate with the Utility Owner to prevent or reduce such delays, and (ii) Design-Builder has otherwise made diligent efforts to obtain the timely cooperation of the Utility Owner but has been unable to obtain such timely cooperation;
- (b) If Design-Builder is responsible for the Relocation, Design-Builder has provided a reasonable Relocation plan to the Utility Owner and Design-Builder has obtained, or is in a position to timely obtain, all applicable approvals, authorizations, certifications, consents, exemptions, filings, leases, licenses, permits, registrations, options and/or rulings required by or with any Governmental Person in order to design and construct such Relocation; and
- (c) No circumstances exist which have delayed or are delaying the affected Relocation, other than those which fit within the definition of a Utility Delay.

6.2.5.3 Concurrent Delays

To the extent one or more Utility Delays is or are concurrent with any other delay which is Design-Builder's responsibility hereunder but which is not a Utility Delay, whether or not such other delay is on the Critical Path, then such Utility Delay(s) shall not be considered in calculating any four-Day cap on Design-Builder's risk pursuant to Section 6.2.5.1. Furthermore, to the extent two or more Utility Delays occur concurrently with each other (whether caused by the same Utility Owner or by different Utility Owners), then only one of such Utility Delays shall be considered in calculating a four-Day cap on Design-Builder's risk pursuant to Section 6.2.5.1 (in selecting between two or more Utility Owners for such purpose, the Utility Delay caused by the Utility Owner with the least amount of accrued Utility Delay shall be selected and applied to the four-Day cap on Design-Builder's risk for such Utility Owner).

6.2.6 Certain Obligations of Design-Builder; Utility-Related Right of Way Costs

6.2.6.1 Multiple Relocations of the Same Utility

Design-Builder shall endeavor to avoid multiple Relocations of the same Utility, whether by the Utility Owner or by Design-Builder. Accordingly, after a Utility has been Relocated once in order to accommodate the Project, Design-Builder shall be responsible for all costs incurred by either Design-Builder or the Utility Owner in order to subsequently Relocate such Utility to accommodate the Project. If the Utility Owner performs such subsequent Relocation at Department's expense, then Design-Builder shall reimburse Department for all amounts paid by Department to such Utility Owner in reimbursement for such subsequent Relocation. If Design-Builder performs such subsequent Relocation, then Design-Builder shall not receive any extension of any Completion Deadline or increase in the Contract Price on account of the performance of such subsequent Relocation.

6.2.6.2 Minimizing Department's Reimbursement Obligation

In designing and constructing the Project, Design-Builder shall take all reasonable steps to minimize costs to the Utility Owners which will be subject to reimbursement by Department, to the extent practicable and otherwise consistent with other requirements of the Contract Documents.

6.2.6.3 Utility-Related Right of Way Costs

6.2.6.3.1 Department's Responsibility

With respect to Utility Easements other than those described in Section 6.2.6.3.2, Department shall be responsible for any compensation required to be paid to Utility Owners for relinquishing their Utility Easements.

6.2.6.3.2 Design-Builder's Responsibility

With respect to Utility Easements resulting from a change in Basic Configuration, Design-Builder shall be responsible for, and shall reimburse Department within 10 Days after receiving an invoice therefor, any compensation which Department may be obligated to pay to the Utility Owners for relinquishing such Utility Easements.

Also refer to:

6.2.4 Betterments

6.2.7 Additional Restrictions on Change Orders

Clause Code:	026-ODP-01
Clause Type:	Order of Document Precedence
Project Name:	TH 371 Four Lane Expansion Design-Build Project
Owner Name:	Minnesota DOT
Year Published:	2015

Design-Build Contract BOOK 1

1 CONTRACT COMPONENTS; INTERPRETATION OF CONTRACT DOCUMENTS

<Omitted>

1.3 Order of Precedence

Each of the Contract Documents is an essential part of the Contract, and a requirement occurring in one is as binding as though occurring in all. The Contract Documents are intended to be complementary and to describe and provide for a complete Contract. In the event of any conflict among the Contract Documents, the order of precedence shall be as set forth below:

- (a) Change Orders and Contract amendments
- (b) Book 1, as executed by MnDOT and Contractor (Design-Build Contract)
- (c) Book 2 (Project Requirements)
- (d) Book 3 (Applicable Standards)
- (e) The Proposal, except if the Proposal includes statements that can reasonably be interpreted as offers to provide higher quality items than otherwise required by the Contract Documents or to perform services in addition to those otherwise required, or otherwise contains terms that are more advantageous to MnDOT than the requirements of the Contract Documents, as determined by MnDOT, Contractor's obligations hereunder shall include compliance with all such statements, offers and terms. If an Approved Alternative Technical Concept (ATC) was incorporated into the Proposal, such Approved ATC and any associated conditions of Approval will take precedence over conflicting requirements of standards in Book 1, 2, or 3.
- (f) The Statement of Qualifications, except if the Statement of Qualifications includes statements that can reasonably be interpreted as offers to provide higher quality items than otherwise required by the Contract Documents or to perform services in addition to those otherwise required, or otherwise contains terms that are more advantageous to MnDOT than the requirements of the Contract Documents, as determined by MnDOT, Contractor's obligations hereunder shall include compliance with all such statements, offers, and terms.

In the event of conflicting requirements involving any requirement established by reference contained in the Contract Documents, MnDOT shall have the right to determine, in its sole discretion, which requirement applies.

Contractor shall request MnDOT's determination respecting the order of precedence among conflicting provisions promptly upon becoming aware of any such conflict.

Book 2 Section 5

5 Quality Management

<Omitted>

5.3 Administrative Requirements

5.3.1 Standards

In the event of a conflict between the standards set forth in Book 3 relating to quality management, the order of precedence is set forth below unless otherwise specified:

MnDOT Technical Memoranda

MnDOT Standard Specifications for Construction

MnDOT Special Provisions

MnDOT CADD Data Standards

MnDOT Bridge Office Summary of Recommended Drafting Standards

MnDOT Technical Certification Handbook

MnDOT Bridge Construction Manual

MnDOT Concrete Manual

MnDOT Bituminous Manual

MnDOT Grading and Base Manual

AASHTO/NSBA Steel Bridge Collaboration—Shop Detail Drawing Review/Approval Guidelines

AASHTO/NSBA Steel Bridge Collaboration—Shop Detail Drawings Presentation Guidelines

AASHTO/NSBA Steel Bridge Collaboration—Steel Bridge Fabrication QC/QA Guide Specification

Remaining standards set forth in Book 3

Clause Code:	027-ODP-01
Clause Type:	Order of Document Precedence
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

III. CONTRACT TERMS AND CONDITIONS

<Omitted>

Design-Build Contract – Order of Precedence]

(a) The contract includes the standard contract clauses and schedules current at the time of award. It also entails: (1) the solicitation in its entirety, including all drawings and illustrations, and any amendments during proposal evaluation and selection, and (2) the successful Offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

(b) In the event of conflict or inconsistency between any of the provisions of the various portions of this contract, precedence shall be given in the following order:

- (1) Betterments: Any portions of the Offeror's proposal, which both meet and exceed the provisions of the solicitation.
- (2) The provisions of the solicitation. (See also Contract Clause: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.)
- (3) All other provisions of the accepted proposal.
- (4) Any design products, including but not limited to plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc. These are "deliverables" under the contract and are not part of the contract itself. Design products must conform to all provisions of the contract, in the order of precedence herein.

Clause Code:	028-REF-01
Clause Type:	Reference Documents
Project Name:	US 90 (I-49 South) Albertson's Parkway to Ambassador Caffery Design-Build Project
Owner Name:	Louisiana DOT
Year Published:	2013

PART 3 - DESIGN REQUIREMENTS AND PERFORMANCE SPECIFICATIONS

<Omitted>

2.4 DESIGN CODES AND MANUALS

In addition to these requirements listed in this Section 2.0 and the performance specifications, the Designer must comply with all other applicable and currently effective engineering codes and standards, including those of the various federal, state, and local jurisdictions.

If codes, standards, and/or manuals are specified herein for the design of an element of the Project, then the edition(s) in effect at the date of issuance of the Request for Proposal (or date of subsequent addendum revising the code or manual) shall be applicable to the Project. Responsibility for design remains with the Design-Builder in accordance with the terms and conditions of the Contract. If a code, manual, or standard is subsequently modified, the Design-Builder shall notify the LA DOTD of such modification(s) and request the LA DOTD's decision regarding application of the modification(s). If the LA DOTD directs the Design-Builder to comply with the modifications and any change in the cost or time of performance results, such change shall be covered by a change order.

Specific codes and standards include, but are not limited to, the following:

- A) LA DOTD Design Guidelines for Freeways (F2 Roadway Classification);
- B) AASHTO A Policy on Geometric Design of Highways and Streets (Green Book), Fifth Edition, 2004;
- C) AASHTO Roadside Design Guide, Third Edition, 2006; and
- D) Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition with revisions number 1 and 2.
- E) Louisiana Construction Quality Assurance Program (CQAP), 2013

<Omitted>

1.1 STANDARDS AND REFERENCES

Standards and references are cited within the performance specifications. The following distinction between "standards" and "references" apply. Standards constitute a further elaboration of the requirement. References constitute advisory or information material, provided for the Design-Builder's benefit, that need not be followed but in some cases provide acceptable solutions already in use by the LA DOTD. In some cases, specific parts of the reference are cited in performance specifications as requirements.

Refer also to:

PART 3 – PERFORMANCE SPECIFICATIONS APPENDIX A

Clause Code:	029-REF-02
Clause Type:	Reference Documents
Project Name:	Ambassador Bridge Plaza – Gateway Completion
Owner Name:	Michigan DOT
Year Published:	2012

APPLICABLE STANDARDS BOOK 3

1 INTRODUCTION

This is a listing of standards that the Contractor shall utilize in performing the final design and construction of the Project described in the RFP. It shall be the Contractor's responsibility to ensure that the most current version at the time of the Proposal Due Date is used for each of the references listed, unless noted otherwise or directed by MDOT. See each section for specific requirements from the references, as well as the hierarchy of the references for that section.

MDOT and Other References. All Project design and construction shall be performed in accordance with the requirements of this RFP and the Michigan Department of Transportation (MDOT) *Standard Specifications for Construction*, 2003 Edition (Standard Specifications), as well as the other special provisions, manuals, technical memoranda, standards, and guidelines listed in the Contract Documents. The criteria listed within the Standard Specifications and the MDOT engineering manuals and other references are considered minimums in terms of the required quality of Project workmanship and design. Where MDOT has not included a special provision applicable to the Contractor's Work, or where the Contractor proposes additional or different special provisions, these special provisions shall be subject to the Approval of MDOT.

If it is not clear to the Contractor how the special provisions, manuals, technical memoranda, standards, or guidelines should be interpreted, the Contractor shall have the obligation to raise the issue with MDOT.

Regardless of whether the Contractor raises the issue, MDOT shall always have the right to notify the Contractor if the Contractor is interpreting the requirements incorrectly.

MDOT Web site. Ordering information for most MDOT references, including specifications, plans, and details, is on MDOT's Web site: <http://www.michigan.gov/mdot/>

MDOT Manuals. When an RFP document or manual refers to other MDOT manuals, the applicable MDOT version in effect at the time of the Proposal Due Date shall be used.

Road Design Manual. Specifically, the Roadway geometric design shall be in accordance with the *MDOT Road Design Manual*, which specifies MDOT's new Construction/Reconstruction Standards. These standards shall be used for each of the design elements described in this RFP, unless otherwise noted.

Other Design Criteria. Unless otherwise specified in this RFP, the Project design shall be governed by MDOT policies, specifications, standards, manuals, guidelines, and technical memoranda, including all addenda, supplements, and revisions thereto. Generally, the design shall comply with the criteria established by MDOT and AASHTO. The latest version (current version as of the Proposal Due Date) of these references shall be used unless otherwise specified.

Web sites. Web sites have been supplied to the Contractor for some of the standards listed below for convenience only in an effort to help the Contractor locate the required standard. The Web sites are not guaranteed to be correct. It is ultimately the Contractor's responsibility to locate the required standard and to determine if the standard has been modified pursuant to this RFP.

General modifications. The following modifications shall apply to applicable standards in Book 3.

GENERAL

1. All references to standards, codes, or criteria, or to the latest version of other standards, codes, or criteria in Book 2 of the Contract Documents shall mean the latest version as of the Proposal Due Date.
2. Certain MDOT standards have been written as guidance documents and not as mandatory requirements. For purposes of this Project, the Contractor shall assume that all provisions of MDOT standards, including figures and tables, are mandatory, and guidelines shall be assumed to be requirements. All words such as "should," "may," "could," and "can" shall mean "shall" unless the context requires otherwise, as determined in the sole discretion of MDOT. The Contractor shall disregard qualifying words such as "usually," "normally," and "generally." In addition, references to MDOT's preferred practices and policies shall be construed to be mandatory requirements unless the context requires otherwise, as determined in the sole discretion of MDOT. It shall be in MDOT's sole discretion to determine when the context does not require a provision to be mandatory.
3. When a standard refers to an action being necessary, needed, or recommended, the Contractor shall construe the action as required unless the context requires otherwise, as determined in the sole discretion of MDOT.
4. Some standards may provide general information (e.g., descriptions of MDOT divisions and their duties, descriptions of legal authority, or descriptions of internal MDOT procedures) that does not apply to design-build contracts; however, in some cases it may not be clear whether rights or responsibilities are applicable to the Contractor. If it is unclear whether specific provisions in the standard are applicable to the Contractor, the Contractor shall raise the issue with MDOT and MDOT shall make that determination in its sole discretion.
5. If the Contractor believes that an item in the standards is unclear, the Contractor shall have the obligation to raise the issue with MDOT. Regardless of whether the Contractor raises the issue, MDOT shall always have the right to notify the Contractor if the Contractor is interpreting the requirement incorrectly.

QUANTITIES AND PAYMENT

1. All references related to pay items or quantities, measurement for payment, method of measurement, basis of payment, extra work, adjustment of unit prices, or similar phrases shall be disregarded by the Contractor, except guidance or information on disincentives for Nonconforming Work shall be either the specific dollar amount or percent set forth in the Standards or a unit price proposed by the Contractor and Approved by MDOT.
2. When a standard refers to "extra work," "compensation for," "at the Department's expense," "quantity adjustments," "equivalent quantities," or similar phrases, such references shall be disregarded. It is the intent that the payment of the Contract Price will be full compensation for all Work performed pursuant to the Design-Build Contract unless specific provisions for additional payments are contained in Book 1 or Book 2 of the Contract Documents.

ROLES AND RESPONSIBILITIES

1. When a standard refers to "Engineer" relating to design responsibilities, such references shall mean the Contractor's Engineer, unless otherwise specified. It shall be in MDOT's sole discretion to

determine when the context refers to design responsibilities.

2. When a standard uses the term “Engineer” relating to construction inspection, materials testing, disposal, restoration, extension of time, testing frequency, testing results and suitable method, such term shall mean MDOT. It shall be in MDOT’s sole discretion to determine when the context refers to these applications.
3. When a standard uses the term “Engineer” relating to activation or de-activation of railroad or highway signals, or the approval of any activities involving the use of explosives, such term shall mean MDOT.
4. When an Approval or Authorization of the “Engineer” or “MDOT” is required in a standard for the use of alternative or substituted processes or components, the “Engineer” shall mean MDOT.
5. When a standard requires actions, dimensions, spacing, design information, materials as designed, means, or methods that are “either as indicated in the Plans or as designated by the Engineer,” the Contractor shall disregard the phrase “or as designated by the Engineer.”
6. When a standard refers to the “Engineer” ordering work beyond the scope of Work in the Contract, “Engineer” shall mean MDOT. Whenever the Engineer may order work that results in additional costs to MDOT, the “Engineer” shall mean MDOT.
7. Wherever references to “Engineer” result in testing or Acceptance procedures being assigned to the Engineer, Acceptance will be on behalf of MDOT. MDOT reserves the right to perform additional tests and inspections as necessary to confirm that the Work is in conformance with Contract requirements and will be the only party authorized to Accept or Approve the Work on behalf of the State.
8. When a standard refers to unauthorized Work or to Acceptance of non-conforming Work by the “Engineer,” the “Engineer” shall mean MDOT.
9. When a standard refers to “Department,” departments or divisions within MDOT, or specific job titles within MDOT, such reference shall mean MDOT.
10. Any acceptances on behalf of MDOT, Department or the State shall be performed by MDOT.
11. When any references occur in a standard to the “Engineer” that refers to the time period after Final Acceptance, the term “Engineer” shall mean MDOT.
12. When a standard requires notifications to the “Engineer”, the “Engineer” shall mean MDOT.
13. When a standard refers to an Approval of any correction or repair that deviates from the Contract requirements, the Approval must be by MDOT.
14. When a standard refers to items that will be performed or provided by MDOT or by a division or employee of MDOT, the Contractor shall construe the requirements as applying to the Contractor unless otherwise specified in the Contract Documents, or unless the context requires otherwise. It shall be in MDOT’s sole discretion to determine when the context requires otherwise.
15. When a standard refers to the “Project Manager” as it relates to plan processes, sending information or requesting information from internal MDOT entities, the term “Project Manager” shall mean MDOT. The Contractor shall submit all requests directly to the MDOT Project Manager on the Project.

2 LIST OF STANDARDS

Specific References Cited for the RFP:

Availability Legend:

IS = Industry standard, Contractor’s responsibility to acquire.

W = Standard is available as a download on the organization’s Web site, Contractor’s responsibility to acquire.

E = Document to be given to Contractor in electronic PDF format. In some cases, if a different format is available, the document may be provided to the Contractor on a DVD with other Contract Document materials.

Clause Code:	030-DO-01
Clause Type:	Ownership of Documents
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

CONTRACT DOCUMENTS PART 2
DB SECTION 104 SCOPE OF WORK

DB 104-2 INTENT OF CONTRACT

<Omitted>

DB 104-2.3 Ownership of Work Product and Intellectual Property Licenses

Provided the Department has made payment to the Design-Builder as required therefore by this Contract, all Work Product furnished by the Design-Builder to the Department hereunder shall be considered property of the Department, except that all pre-existing copyrights, design rights, patents, trademarks, trade secrets and other intellectual property rights in the Work Product (collectively, “Pre-existing IP Rights”) shall remain the property of the Design-Builder. The Design-Builder hereby grants to the Department an irrevocable license, in perpetuity and at no additional cost, to retain and use Pre-existing IP Rights for operations, maintenance and improvements to the Project, and for other purposes relating to the Department’s facilities or operations. Such license includes the right to grant sublicenses to the Department’s contractors and subcontractors of any tier. Subject to the foregoing, Design Documents shall become the Department’s property upon preparation; shop drawings, working drawings and samples shall become the Department’s property upon delivery to the Department; and other documents prepared or obtained by Design-Builder in connection with the performance of its obligations under the Contract, including studies, manuals, as-built drawings, technical and other reports and the like, shall become the property of the Department upon the Design-Builder’s preparation or receipt thereof. Copies of all Design Documents, shop drawings and working drawings shall be furnished to the Department upon preparation or receipt thereof by the Design-Builder. The Design-Builder shall maintain all other documents described in this DB §104-2.3 in accordance with DB §104-16 and as otherwise required by the Contract Documents, and shall deliver copies to the Department as required by the Contract Documents or upon request if not otherwise required to be delivered, with an indexed set delivered to the Department as a condition to Final Acceptance.

The Department hereby grants to the Design-Builder a non-exclusive, royalty-free license to use intellectual property included in the Work Product in connection with Work performed hereunder and with respect to other projects undertaken by the Design-Builder, provided that said license does not apply to any Pre-existing IP Rights. Said license includes the right to grant sublicenses to Subcontractors responsible for development of said intellectual property.

Clause Code:	031-DO-02
Clause Type:	Ownership of Documents
Project Name:	Interstate 85/385 Interchange Improvements
Owner Name:	South Carolina DOT
Year Published:	2014

II. PROJECT SCOPE

<Omitted>

F. Ownership of Documents

Drawings, specifications, test data, inspection reports, QC documents, daily diaries and any other documents, including those in electronic form, prepared by CONTRACTOR or CONTRACTOR's consultants are "Project Documents". CONTRACTOR and CONTRACTOR's consultants shall be the owner of the Project Documents. Upon the Effective Date of this Agreement, CONTRACTOR grants SCDOT a nonexclusive license to reproduce the Project Documents for the purposes of, but not limited to, promoting, using, maintaining, upgrading, or adding to the Project. Upon completion of the Project or upon default by CONTRACTOR, CONTRACTOR shall provide copies of all Project Documents to SCDOT in the format designated by SCDOT.

Refer also to:

- I. PURPOSE OF REQUEST FOR PROPOSALS**
- II. XIII. STIPEND AGREEMENT**

Clause Code:	032-STP-01
Clause Type:	Stipend
Project Name:	I-15 Cajon Pass Rehabilitation Design-Build Project
Owner Name:	California DOT
Year Published:	2013

APPENDIX H

STIPEND POLICY

Each Proposer that submits a responsive, but unsuccessful, Proposal (including the Administrative Submittals and Price Proposal) shall be entitled to receive payment (“Stipend”) from Department for work product that is not returned to Proposer, on the terms and conditions described herein. No Proposer shall be entitled to reimbursement for any of its costs in connection with the RFP except as specified in this Appendix H.

The Department will pay the Stipend to each Proposer that submits a responsive Proposal, unless the Proposer is not entitled to Stipend as set forth in the ITP. Notwithstanding the foregoing, the Proposer that enters into the Contract with the Department shall not be entitled to the Stipend except as provided for in the Contract.

The stipulated payment for work product per Proposer for this procurement is \$75,000. In order to request payment, each Proposer must submit an invoice to Department. The invoice may be submitted after notice of award, but no later than 30 days after notice of award or, if award is not made, not earlier than 30 days after cancellation of the procurement or expiration of the time period for award stated in the RFP (as such time period may be extended by mutual agreement of the selected Preferred Proposer and Department), as applicable. All Proposers eligible to receive a payment for work product shall be required to submit an invoice to Department in a form acceptable to Department in order to receive such payment. Payments will be made (a) within 60 days after Contract execution, or (b) if award is made but the Contract is terminated, within 30 days of such termination, or (c) if the procurement is cancelled prior to award or award is not made prior to the expiration of the time for award stated in the RFP (as such time period may be extended by mutual agreement of the selected Preferred Proposer and Department), within 30 days of receipt of an invoice after such cancellation or expiration.

Each Proposer agrees that Department shall be entitled to use all work product that is not returned to Proposer (including ATCs, concepts, ideas, technology, techniques, methods, processes, drawings, reports, plans and specifications) contained in its Proposal or generated by or on behalf of Proposer for the purpose of developing its Proposal, in consideration for Department’s agreement to make payment as provided herein, without any further compensation or consideration to Proposer.

Each Proposer acknowledges that Department will have the right to inform the successful Proposer regarding the contents of the other Proposals after Notice of Intent to Award the Contract, and that the Contract may incorporate the above-described work product or concepts based thereon. Upon Proposer’s receipt of payment hereunder, this right shall extend to allow Department to use such work product in the performance of its functions. The use of any of the work product by Department at the sole risk and discretion of Department, and shall in no way be deemed to confer liability on the unsuccessful Proposer.

In no event shall any Proposer that is selected for award but fails to satisfy the award conditions set forth in Section 6.4 and Section 6.5 be entitled to receive a payment for work product under this Appendix H.

Proposers accepting the foregoing terms shall acknowledge such acceptance in the Proposal Letter, Appendix F, Form 1.

Clause Code:	033-STP-02
Clause Type:	Stipend
Project Name:	SH-44 – Linder Road to Ballantyne Lane
Owner Name:	Idaho DOT
Year Published:	2012

ITP.2.7 PROPOSAL STIPEND

Upon execution of Form M, Stipend Agreement (Appendix ITP-C), the Proposer acknowledges that the Department reserves the right to use any ideas or information contained in the Proposal (that are not deemed by the Department as confidential trade secret information) in connection with any contract awarded for the Project, or in connection with a subsequent procurement.

The Department will provide a stipend in the amount of \$13,200 to each unsuccessful responsive Proposer who completes and submits Form M. The unsuccessful responsive Proposers shall meet the following terms and conditions:

- A. The Proposer's Technical Proposal received a rating of "pass" on all pass/fail criteria and an overall technical rating of at least "good" for all other scored evaluation factors.
- B. The Proposer has submitted a responsive Price Proposal.

Proposers submitting non-responsive Proposals are not eligible for payment of a stipend. If the procurement is cancelled prior to the Proposal due date, each Proposer will be provided the opportunity to attend a meeting and deliver to the Department the work product of its Proposal preparations to date. There is no specific format required for such work product. Each Proposer that chooses to attend such a meeting and deliver its work product may be paid a portion of the stipend amount, at the Department's discretion, for the work product. No portion of the stipend amount will be paid if a Proposer chooses to not attend the meeting or not deliver its work product.

FORM M

STIPEND AGREEMENT

PROPOSER: _____

THIS STIPEND AGREEMENT (THE AGREEMENT) IS MADE AND ENTERED INTO AS OF THE _____ DAY OF _____, 201_____, BY AND BETWEEN THE STATE OF IDAHO, ACTING BY AND

THROUGH THE IDAHO TRANSPORTATION DEPARTMENT (DEPARTMENT), AND

_____, A _____

(PROPOSER), WITH REFERENCE TO THE FOLLOWING FACTS:

A. On _____, 2012, the Department issued a Request for Proposals (RFP) for design and construction of SH-44, Linder Road to Ballantyne Lane (the Project), pursuant to procurement authority granted in Idaho Code § 40-904.

B. If elected by the Proposer, the RFP requires each Proposer to execute and deliver a Stipend Agreement to the Department with the RFP.

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Definitions.

All capitalized terms and acronyms used but not defined in this Agreement have the respective meanings set forth in the Instructions to Proposers (ITP) included in the RFP.

2. Work Product.

2.1 The Department hereby retains Proposer to prepare and submit, in response to the RFP a technical proposal and price proposal that conform in all material respects to the requirements of the RFP, as determined by the Department, are timely received by the Department, and satisfy the provisions of Section 3.1 below.

2.2 All work performed by Proposer and its team members pursuant to this Agreement shall be considered work for hire, and the Work Product (as defined below) shall become the property of the Department without restriction or limitation on its use. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

2.3 Proposer agrees that all Work Product is, upon receipt by the Department, the property of the Department. The term "Work Product" shall mean all submittals made by Proposer during the RFP process, including the Proposal, exchanges of information during the pre-proposal and post-proposal period, and shall specifically include alternate technical concepts (ATCs) and options, when applicable, submitted for Department review in accordance with the RFP and submitted as part of the technical proposal. However, the term "Work Product" shall specifically exclude patented rights in previously existing proprietary technology.

2.4 In consideration for the Department's agreement to make payment hereunder, Proposer agrees that the Department shall be entitled to use all Work Product, without any further compensation or consideration to the Proposer, in connection with the RFP, the Contract Documents, the Project, future procurements by the Department, or for any other use as the Department determines necessary or appropriate. Notwithstanding the foregoing, the Department shall not be entitled to use information submitted by Proposer to the Department that has been specifically designated as confidential trade secret information in accordance with ITP.2.6. The Department acknowledges that the use of any of the Work Product by the Department is at the sole risk and discretion of the Department, and shall in no way be deemed to confer liability on the unsuccessful Proposer.

3. Compensation and Payment.

3.1 Compensation payable to Proposer for the Work Product described herein shall be a maximum of \$13,200 if all of the following conditions are met:

- a. Proposer's Technical Proposal has achieved a rating of "pass" on all pass/fail evaluation factors and an overall qualitative rating of at least "Acceptable" for all technical evaluation factors;
- b. The Proposer has submitted a responsive Price Proposal; and
- c. Proposer's Proposal was not selected for award.

3.2 In its sole discretion, the Department may pay compensation to Proposer, in an amount to be determined by the Department, for the Work Product described herein if the procurement is cancelled prior to the Proposal Due Date. Proposers will be provided the opportunity, at their option, of attending an interview and delivering to the Department the Work Product of their Proposal preparations to date. There is no specific format required for such Work Product. Those Proposers that choose to attend the interview and deliver their Work Product may be paid a

portion of the stipend amount that the Department deems to be appropriate consideration for the Work Product. No portion of the stipend amount will be paid if a Proposer chooses not to attend the interview or chooses not to deliver its Work Product.

- 3.3 If the Department awards the Contract to Proposer, Proposer will not be entitled to compensation hereunder and affirmatively waives any claim for such.
- 3.4 Any payment of compensation owing hereunder will be made (i) within 45 calendar days after contract award or (ii) within 45 days after the decision not to award the contract or (iii) in the event the Proposer make a complaint against Award, within 45 days after said complaint is administratively and judicially resolved.

4. **Indemnities.**

- 4.1 Subject to the limitations contained in Section 4.2 below, Proposer shall indemnify, protect, hold harmless, and defend at its own expense, the Department and its directors, officers, employees, and contractors from all claims, costs, expenses, liabilities, demands, or suits at law or equity arising in whole or in part from the negligence or misconduct of Proposer or any of its agents, officers, employees, representatives, or Subcontractors, or from any breach of any of Proposer's obligations under this Agreement.
- 4.2 This indemnity shall not apply with respect to any claims, demands, or suits arising from use of the Work Product by the Department or its contractors.

5. **Compliance with Laws.**

- 5.1 Proposer shall comply with all Federal, State, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of care provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.
- 5.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract except a subcontract for standard commercial supplies or raw materials; and (c) to post and to cause Subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

6. **Assignment.**

Proposer shall not assign this Agreement without the Department's prior written consent, which shall be provided at the sole discretion of the Department. Any assignment of this Agreement without such consent shall be null and void and shall waive any claim to any stipend amount by the assignee.

7. **Miscellaneous.**

- 7.1 Proposer and the Department agree that Proposer, its team members, and their respective employees are not agents of the Department as a result of this Agreement.
- 7.2 All words used herein in the singular form shall extend to and include the plural. All words used in the plural form shall extend and include the singular. All words used in any gender shall extend to and include all genders.

7.3 This Agreement, together with the RFP, as amended by addendum, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either verbal or written, between the parties hereto.

7.4 The parties agree that any dispute pertaining to this Agreement shall be under the jurisdiction of the courts of the State of Idaho, and that appropriate venue shall be had in Ada County, Idaho. It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is held to be illegal or in conflict with any law of the State of Idaho, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

7.5 This instrument may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

7.6 This Agreement shall be governed by and construed in accordance with the laws of the State of Idaho.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.
STATE OF IDAHO by IDAHO TRANSPORTATION DEPARTMENT

Approved for Execution:

Innovative Contracting Manager

Date

Approved as to availability of funds:

District Engineer

Approved as to form and legal sufficiency:

Deputy Attorney General

WITNESS:

Proposer Name

Federal ID # or Social Security #

By _____

Member Name _____

By _____ (Seal)

Title: _____

Printed Name

By _____

Member Name _____

By _____ (Seal)

Title: _____

Printed Name

By _____

Member Name _____

By _____ (Seal)

Title: _____

Printed Name

Clause Code:	034-PAY-01
Clause Type:	Payment Method
Project Name:	Interstate 85/385 Interchange Improvements
Owner Name:	South Carolina DOT
Year Published:	2014

AGREEMENT

III. CONTRACT PRICE/CONTRACT PAYMENTS

A. Contract Price The “Contract Price” shall be \$_____. In consideration for the Contract Price, CONTRACTOR shall perform all of its responsibilities under the Contract. The Contract Price shall include all work identified in the Project Scope of Work - **EXHIBIT 3**, and as identified in the Cost Proposal Bid Form – **EXHIBIT 1**.

B. Contract Price Adjustments

1. Allowable adjustments The Contract Price may be adjusted to reflect the direct costs, plus an additional amount not to exceed 10% of the direct costs for the combined total of reasonable overhead* and profit, associated with any of the following:

- a) Amount added or deducted as the result of a “Change” or “Construction Change Directive”.
- b) Differing site condition as defined in Article XIII.
- c) Intentional or bad faith acts or omissions by SCDOT that unreasonably interfere with CONTRACTOR’s performance and cause delay of work on the critical path of the Project.
- d) Changes in legal requirements or regulations that are effective subsequent to the date of this Agreement.
- e) Discovery of hazardous materials as set forth in Article XI.
- f) Discovery of archeological or paleontological sites not previously identified as noted in Article X.
- g) Premium right-of-way costs and second appraisals as set forth in Article VIII. Only the actual premium right-of-way and actual second appraisal cost will be reimbursed. No additional amount for overhead and profit will be considered for this item.

* Overhead: The operating expense of a business exclusive of direct cost labor and material.

Other than as provided above, the Contract Price shall not be increased for contract time adjustments or delay damages. Contract Price adjustments shall be documented by Supplemental Agreement signed by both parties and shall be reflected immediately in the Schedule of Values. No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this Agreement.

2. Changes

- a) A “Change” shall be any deviation or variation from the Project Scope or the Project Criteria. No Change shall be implemented without the express written approval of SCDOT. A “Change” may be an “Additive Change” or a “Deductive Change”.

b) SCDOT may initiate a change by advising CONTRACTOR in writing of the change. As soon thereafter as practicable, CONTRACTOR shall prepare and forward to SCDOT an estimate of cost or savings, and the impact to the schedule resulting from the change. SCDOT will advise CONTRACTOR in writing of its approval or disapproval of the change. If SCDOT approves the change, CONTRACTOR shall perform the Services as changed.

3. Construction Change Directive

A Construction Change Directive is a written order from SCDOT directing a change prior to agreement with CONTRACTOR on adjustment, if any, to the Contract Price or Contract Time. If a price for the work cannot be agreed upon, CONTRACTOR shall perform the work under Force Account Procedures as outlined in Section 109.5 of SCDOT's Standard Specifications.

4. Direct Costs

For the purpose of a Contract Price Adjustment, "Direct Costs" shall be defined as:

- a) Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- b) Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- c) Actual costs of machinery and equipment owned by CONTRACTOR or any affiliated or related entity exclusive of hand tools;
- d) Actual costs paid for rental of machinery and equipment exclusive of hand tools;
- e) Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes;
- f) Additional costs of supervision and field office personnel directly attributable to the change or event; and
- g) Costs incurred or fees paid for design work related to the change or event.

C. Contract Payments

1. Schedule of Values

Prior to execution of this Agreement, CONTRACTOR shall provide a Schedule of Values acceptable to SCDOT and work may not start until the Schedule of Values is approved by SCDOT. The Schedule of Values will serve as the basis for cost loading of the CPM Schedule. The CPM schedule shall include sufficient information to provide for monetary and quantitative tracking of the work by SCDOT. Updates to the cost-loaded CPM schedule will serve as the basis for progress payments requested by and made to CONTRACTOR. If the Contract Price is adjusted, CONTRACTOR shall revise its Schedule of Values and the CPM Schedule to reflect the adjustment in the Contract Price. The revised Schedule of Values must be approved by SCDOT prior to the time for the subsequent request for a progress payment otherwise no progress payments will be made. The Schedule of Values shall be incorporated herein as **EXHIBIT 2**. The Schedule of Values should include Lump Sum items that will serve as measurement and payment for any item referred to in this Contract as a "contract unit bid price" item.

2. Mobilization

Mobilization shall not exceed 5% of the construction cost as shown in the Schedule of Values. Mobilization will be paid at the start of construction.

3. Periodic Progress Payment Applications

No application for payment of the Contract Price shall be submitted until SCDOT gives a notice to proceed. Applications for payment of the Contract Price may be submitted once a month. Each application for payment of the Contract Price shall set forth, in accordance with the Schedule of Values and the cost-loaded CPM schedule, the percentage of all items comprising the work completed since CONTRACTOR's immediately prior request for payment. The application for payment of the Contract Price may also request payment for equipment and materials not yet incorporated into the Project, provided that (i) SCDOT is satisfied that the equipment and materials are suitably stored at either the Project or another acceptable location, (ii) the equipment and materials are protected by suitable insurance and (iii) upon payment, SCDOT will receive title to the equipment and materials free and clear of all liens and encumbrances.

4. Periodic Progress Payments

SCDOT will review each application for payment. Upon approval by SCDOT of an application for payment, SCDOT will pay CONTRACTOR the undisputed percentage for the Project completed during the period covered by the application for payment. SCDOT will make each payment within twenty-one (21) days of the receipt of the corresponding Application for Payment. In the event of a dispute over the quality of work or percentage of the Project completed, SCDOT's decision is controlling and final. Payment by SCDOT will not preclude or estop SCDOT from correcting any measurement, estimate, or certificate regarding the percentage completion of the Project, and future payments may be adjusted accordingly.

5. Prompt Payment of Subcontractors

- a) Subject to the provisions on retainage provided in Paragraph (b) below, when a subcontractor has satisfactorily performed a work item of the subcontract, CONTRACTOR must pay the subcontractor for the work item within seven (7) calendar days of CONTRACTOR's receipt of payment from SCDOT. A subcontractor shall be considered to have "satisfactorily performed a work item of the subcontract" when SCDOT pays CONTRACTOR for that work item.
- b) CONTRACTOR may withhold as retainage up to five (5%) percent of a subcontractor's payment until satisfactory completion of all work items of the subcontract. "Satisfactory completion of all work items of the subcontract" shall mean when SCDOT pays CONTRACTOR for the last work item of the subcontract. CONTRACTOR must release to the subcontractor any retainage withheld within seven (7) calendar days from the date CONTRACTOR receives payment from SCDOT for the last work item of the subcontract. For further information regarding Retainage, see Article III, paragraph D.
- c) With each progress payment application, CONTRACTOR shall certify to SCDOT that the payment application is complete and that all subcontractors have been paid for work covered by previous applications.

d) Failure to comply with any of the above provisions shall result in one or more of the following sanctions: (1) no further payments to CONTRACTOR unless and until compliance is achieved; (2) CONTRACTOR being placed in default; and/or (3) CONTRACTOR being declared delinquent, such delinquency being subject to procedures and penalties provided in 108.8 of the Standard Specifications.

6. Withholding of Payment

SCDOT may withhold all or part of any payment under the Contract because for any of the reasons listed below. Any funds withheld will be released upon CONTRACTOR satisfactorily remedying the defect, fault, or failure and will be included in the next regularly schedule pay estimate. Payment will be subject to retainage if applicable.

- a) Defective work not remedied. Any such withholding, however, shall not exceed two times the reasonable cost of remedying the defective work. Defective work shall be defined as work or material not conforming to the requirements of the Contract;
- b) Reasonable evidence that the Work will not be Substantially Complete within the Contract Time as adjusted and that the unpaid balance of the Contract Price will not be adequate to cover Liquidated Damages for the actual unexcused delay;
- c) Failure to comply with the prompt payment provision of this Contract;
- d) Any fines or other charges to SCDOT due to CONTRACTOR's failure to comply with permit requirements or other regulations;
- e) Notice of cancellation of insurance;
- f) Failure to submit updated and approved CPM or Schedule of Values;
- g) Violation of QC plan requirements;
- h) Failure to follow specifications or procedures required by the Contract;
- i) Failure to comply with DBE, On-The-Job training, or Pre-Employment Training provisions;
- j) Failure to provide adequate work zone traffic control;
- k) Failure to provide adequate sediment and erosion control; or,
- l) Violation of any contract provisions.

D. Retainage

Provided the Project is proceeding satisfactorily, SCDOT will not withhold retainage. However, if at any time SCDOT determines that CONTRACTOR fails to meet contract terms or the Project is not proceeding satisfactorily, SCDOT may retain up to 10% of the Contract Price as retainage. If the reason for SCDOT's withholding of retainage is attributable to a subcontractor's failure to perform, CONTRACTOR may withhold up to 10% of the subcontractor's payment until all work of the subcontract work is satisfactorily performed. If it decides to withhold retainage, SCDOT will not withhold more than 20% of any single payment application. SCDOT will have sole authority to determine the amount (not exceeding 10%) and necessity of retainage.

<Omitted>

EXHIBIT 5 – SPECIAL PROVISIONS

<Omitted>

(29) SECTION 109: REFERENCES TO UNIT PRICING:

Any references in the contract documents to unit price, measurement, and payment, are typical references for design-bid-build contracts and are not applicable to the extent they effect payment on Design-Build contracts. The CONTRACTOR's schedule of values shall provide sufficient detail to compare work progress to the contractor's schedule and determine appropriate periodic payments.

Refer also to:

EXHIBIT 6 - SUPPLEMENTAL SPECIFICATIONS AND FORMS, PROMPT PAYMENT CLAUSE

Clause Code:	035-PAY-02
Clause Type:	Payment Method
Project Name:	SH-55 Gold Fork River Bridge
Owner Name:	Idaho DOT
Year Published:	2015

DESIGN-BUILD AGREEMENT

Article 4 Compensations

4.2 Progress Payments - Department will make progress payments to Design-Build Firm in accordance with the Contract. Progress payments shall be based upon Design-Build Firm's Schedule of Values, which shall include the cost of all Work. Department's payment of progress payments shall not be deemed by either Party to constitute acceptance or approval of any price item covered by such payment, or a waiver of a claim or demand for repair of any defects therein.

4.3 Adjustments to the Contract Amount - The Contract amount shall only be adjusted through issuance of properly-authorized change orders.

4.4 Deductions from Monies Due - Department may deduct from monies due or to become due Design-Build Firm: (a) amounts representing fuel, asphalt, and other price adjustments; (b) amounts representing recoupment of damages, including but not limited to liquidated damages; (c) amounts assessed by third-parties (e.g., fines and penalties) for which Design-Build Firm is responsible under the terms or the Contract or by law; (d) amounts Department is compelled by court order or other legal mandate to withhold and/or tender to third parties; (e) amounts as reimbursement for Department payments made on behalf of Design-Build Firm or to meet Design-Build Firm obligations, as authorized under terms of the Contract; and (f) any other amounts authorized under the Contract or by law to be deducted or withheld.

<Omitted>

Design-Build Construction Administration Special Provision

112.13 Progress Payment Documentation

DBF shall make available to the Engineer pay documentation for each progress payment request. Pay documentation includes ITD-2780, Pay Item Report, with supporting attachments, materials certifications, material test reports, fuel and asphalt adjustment calculations, material quality bonus calculations, and required contractual adjustments. Enter applicable MSR information into MAPs prior to requesting payment.

CQAM shall review monthly progress payment requests to ensure that acceptable quality documentation is on file for all payment items. The CQAM will certify that the quality requirements have been met for all activities for which payment is requested. The Department will conduct the final payment audit.

Clause Code:	036-PAY-03
Clause Type:	Payment Method
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

Section 109. — MEASUREMENT AND PAYMENT

109.01. Measurement of Work. Delete the entire text and substitute the following:

109.01. Scope of Payment.

The proposal and subsequent contract will establish a lump sum price for completion of the work under a single pay item. Payment for all contract work is provided, either directly or indirectly, under the bid items shown in the *Price Form 01, Price Proposal Summary*. The form is provided in Section 109.06.

All other activities will be considered indirect costs and will not be measured for payment.

Work for which direct payment is not provided is a subsidiary obligation of the Contractor. Payment for such work is indirectly included in the bid items shown in *Price Form 01*. Compensation provided by the bid item included in the contract is full payment for performing all contract work in a complete and acceptable manner. All risk, loss, damage, or expense arising out of the nature or prosecution of the work is included in the compensation provided by the contract pay items.

Price Proposal Forms

At the time of proposal submit completed *Price Form 01* as follows:

a) Lump Sum Bid Items Enter a cost for each lump sum bid item indicated on *Price Form 01* for Schedule A and for Bid Alternative Schedule. The total amount for each form shall match the Total Contract Price for Schedule A and the Bid Alternative single lump sum submissions on Sheet A-3. All indirect items, including but not limited to: contractor QA and QC, survey, traffic control, erosion control, turf establishment, etc., will be considered subsidiary to the items listed on *Price Form 01* and distributed at the proposer's discretion.

Total Contract Price: The Total Contract Price will be the summation of the lump sum bid items and should match the single lump sum contract pay item on Sheet A-4 of the awarded Bid Schedule.

109.05. Final Payment. FAR Clause 52.232-5 - Payment under Fixed-Price Construction Contracts and FAR Clause 52.232-27 – Prompt Payment for Construction Contracts are supplemented as follows:

Upon final acceptance and verification of final pay records, the Government will send, by certified mail, a final voucher (SF 1034) and a release of claims document. Execute both the

voucher and the release of claims and return the documents to the Government for payment. The date of approval by the Government of the final voucher for payment constitutes the date of final settlement of the contract.

If unresolved claims exist or claims are proposed, reserve the right to the claims by listing a description of each claim and the amount being claimed on the release of claims document.

Failure to execute and return the voucher and release of claims document within 90 days after receipt shall constitute and be deemed execution of the documents and the release of all claims against the Government arising by virtue of the contract. In this event, the day after 90 days from receipt constitutes the date of final settlement of the contract.

109.08. Progress Payments. Add the following:

(b) Closing date and invoice submittal date. Delete the text and substitute the following:

Submit invoices to the designated billing office by the 7th day after the closing date. Invoices received by the designated billing office after the 16th day following the closing date will not be accepted for payment processing that month. Include late, unprocessed invoice submittals in the following months invoice.

(e) Processing progress payment requests.

(1) Proper invoices. Delete the title and text and substitute the following:

(1) Invoices received by the 7th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the Contractor's invoice agree with the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be paid.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(c), or if any of the quantities or unit prices shown on the Contractor's invoice exceed the corresponding quantities and unit prices shown on the Government's receiving report, the invoice will be deemed defective and the Contractor so notified according to FAR Clause 52.232-27(a)(2). Defective invoices will not be corrected by the Government and will be returned to the Contractor within 7 days after the Government's designated billing office receives the invoice.

Revise and resubmit returned invoices by the 18th day following the closing date. The CO will evaluate the revised invoice. If the invoice still does not meet the requirements of Subsection 109.08(c), the Contractor will be so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the revised invoice meets the requirements of Subsection 109.08(c), but still had quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item or work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing by the 23rd day following the closing date. The Contractor will be notified by the 23rd day following the closing date of the reasons for any changes to the invoice.

(2) Defective invoices. Delete the title and text and substitute the following:

(2) Invoices received between the 8th and 16th day following the closing date.

(a) Proper invoices. If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the Contractor's invoice agree with the corresponding quantities and unit prices shown on the CO's receiving report, the invoice will be deemed proper and forwarded for processing within 7 days of receipt.

(b) Defective invoices. If the invoice does not meet the requirements of Subsection 109.08(c), the invoice will be deemed defective, the Contractor so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the invoice meets the requirements of Subsection 109.08(c), but has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Government's receiving report, the Government's data for that item of work will be used. The Contractor's invoice, as revised by the Government's receiving report, will be forwarded for processing within 7 days of the Government's receipt of the invoice. The Contractor will be notified of the reasons for any changes to the invoice.

(f) Partial payments. Delete the subsection and substitute the following:

(f) Partial payments. Progress payments may include partial payment for material to be incorporated in the work according to FAR Clause 52.232-5(b)(2), provided the material meets the requirements of the contract and is delivered on, or in the vicinity of, the project site or stored in acceptable storage places.

Partial payments for stockpiled manufactured material (aggregates) will be based on Contractor process control test results. If test results show the material to be out-of-specification, or in "reject" where statistical evaluation procedures are used, no payment for stockpiled materials will be made.

Partial payment for material does not constitute acceptance of such material for use in completing items of work. Partial payments will not be made for living or perishable material until incorporated into the project.

Individual and cumulative partial payments for preparatory work and material will not exceed the lesser of:

- (1) 80 percent of the contract bid price for the item; or
- (2) 100 percent of amount supported by copies of invoices submitted.

The quantity paid will not exceed the corresponding quantity estimated in the contract. The CO may adjust partial payments as necessary to protect the Government.

Submit progress payments in accordance with Section 155. Request changes in the closing date in writing.

Submit invoices to the Government's on-site Project Engineer by US Mail, FEDEX, or EMAIL. Specific addresses will be provided to contractor at Pre Construction Conference.

Progress payments will be made in conformance with this Section and Section 155 based on the pricing data provided in *Form PP01 and Request for Progress Payment, Form PP02*.

(a) General. Submit the following with the Monthly Update Revision required in Section 155:

1. *Form PP01, Request for Progress Payment*,
2. The information required in FAR Clause 52.232-27(a)(2)(i) through (a)(2)(x).
3. The certification required by FAR Clause 52.232-5(c) and, if applicable, the notice required by FAR Clause 52.232-5(d). Provide an original signature on the certification. Facsimiles are not acceptable.
4. If applicable, a copy of the notices that are required by FAR Clause 52.232-27(e)(5) and (g).
5. The amount included for work performed by each subcontractor under the contract.
6. The total amount of each subcontract under the contract.
7. The amounts previously paid to each subcontractor under the contract.

Adjustments for the following will be made by the Government after validation of the invoice:

- (a) Retention resulting from a failure to maintain acceptable progress.
- (b) Retention resulting from violations of the labor provisions.
- (c) Retention pending completion of incomplete work, other "no pay" work, and verification of final quantities.
- (d) Obligations to the Government such as excess testing cost or the cost of corrective work pursuant to FAR Clause 52.246-12(g).
- (e) Liquidated damages for failure to complete work on time.
- (f) Retention based on materials pay factor adjustments.

If any of the quantities or unit prices shown on the Contractor's invoice exceed the corresponding quantities and unit prices shown on the CO's receiving report, the invoice will be deemed defective and the Contractor so notified according to FAR Clause 52.232-27(a)(2). Defective invoices will not be corrected by the Government and will be returned to the Contractor. Revise and resubmit returned invoices.

(a) Lump Sum Bid Items. Payment for Lump Sum Bid Items will not exceed the corresponding price estimated in the contract. Payment for lump sum bid items will be determined based on the percent complete calculated in the Request for Payment Form PP01.

(b) Withholdings for Statistically Accepted. See the Acceptance Subsection of each Section for acceptance procedures and parameters.

(c) Retainage for Engineer of Records submittals. A 5% retainage will be withheld from each progress estimate. This 5% will be released upon final approval of Engineer of Records design, and construction

109.08. Price Proposal Forms

Price Form 01

Price Proposal Summary for: PROJECT HI STP SR 30(1)

Offeror:

<Omitted>

Clause Code:	037-PS-01
Clause Type:	Progress Schedule
Project Name:	Ambassador Bridge Plaza – Gateway Completion
Owner Name:	Michigan DOT
Year Published:	2012

2.3 Schedule Management

2.3.1 General

The Contractor shall complete and update a computerized Critical Path Method (CPM) Schedule as described herein. Whenever the term “Schedule” is used in the Contract Documents, it shall mean the cost-loaded CPM Schedule. The Work under this Contract shall be planned, reported, and accomplished using CPM.

2.3.2 Definitions

The terms used in this Section 2 shall have the following meanings:

CPM Schedule: The as-planned schedule that represents the Contractor's best judgment and intended plan for completion of the Work in compliance with Contract Documents. The CPM Schedule shall show all planned activities, including activities by any separate contractors, interface dates with Utility owners/municipalities/agencies, all submittal requirements, and submittal review periods.

Critical Activity: An activity with zero or negative Float.

Critical Path(s): The chain of continuous activities controlling the last activity of the Schedule and/or Milestone(s).

Milestone: A contractually obligated Project Start or deadline that shall be designated with an activity type of Milestone. Milestones are the only activities allowed a Start and Finish date constraint. The Contractor may use activity coding to designate other activities of interest.

Float: Number of Days by which a part of the Work in the Schedule may be delayed without extending the Contract Time or Milestone.

Cost-Loaded CPM Schedule (or Schedule): A schedule that has a cost associated with each defined activity.

2.3.3 Software

The Contractor shall use Microsoft Project or other software as Approved by the MDOT Project Manager for schedule management.

2.3.4 General Requirements

The Contractor shall manage and work with each Subcontractor and Supplier to obtain information on activities for implementation and sequencing of the Work. The Schedules shall reflect Contract requirements and known limitations.

Errors or omissions within cost-loaded CPM Schedules shall not relieve the Contractor from finishing all Work within the time limit specified for completion of the Contract. Once the cost-loaded Initial CPM Schedule is Accepted by MDOT, the cost-loaded CPM Schedule becomes part of the Contract.

and replaces and becomes the progress schedule typically used on MDOT projects. The cost-loaded CPM Schedule shall meet the requirements of MDOT Frequently Used Special Provision 102C – Critical Path Method Network Schedule and this Section 2.3. If conflict occurs between requirements of this Section 2 and the MDOT Frequently Used Special Provision 102C – Critical Path Method Network Schedule, this Section 2 shall govern. If, after a cost-loaded CPM Schedule has been Accepted by MDOT, and either the Contractor or MDOT discovers that any aspect of the cost-loaded CPM Schedule has an error or omission, the cost-loaded CPM Schedule shall be corrected.

MDOT will respond with comments or Acceptance within five Working Days of receipt of this cost-loaded Initial CPM Schedule.

2.3.5 Schedule Updates

At a minimum, the Contractor shall prepare a monthly cost-loaded Updated CPM Schedule that accurately reflects the status of Work completed and Work remaining. This submittal shall be readable when printed on 24-inch x 36-inch paper. The Contractor shall meet with MDOT to review each update. Cost-loaded CPM Schedule updates shall be made to the most recently Accepted cost-loaded CPM Schedule. Cost-loaded CPM Schedule updates shall be named to denote the date of submittal. MDOT reserves the right to request hardcopy or Microsoft Project copies of cost-loaded Updated CPM Schedules. If requested, MDOT shall receive the item within five Days of the request.

2.3.6 Acceptance of Schedule

MDOT's review and Acceptance of cost-loaded CPM Schedules will not waive any Contract requirements and shall not relieve the Contractor of any obligation or responsibility for submitting complete and accurate information. By review and Acceptance of the cost-loaded CPM Schedule, MDOT does not endorse or otherwise certify the validity or accuracy of any part of the cost-loaded CPM Schedules. The responsibility for validity and accuracy of all cost-loaded CPM Schedules is the sole responsibility of the Contractor.

2.3.7 Use of Float

The Contractor acknowledges that all Float is a shared commodity available to the Project and is not for the exclusive benefit of any party. Use of any Float-suppressing techniques will be cause for rejection of a cost-loaded CPM Schedule submittal.

2.3.8 Level of Detail

The cost-loaded CPM Schedule shall be cost-loaded and will be used to administer the payments to the Contractor. If the Contractor intends to bill for materials on hand, all procurement Activities must be scheduled and cost-loaded separate from the installation Activities.

The costs assigned to schedule Activities shall roll up to equal the price for the items identified in the Schedule of Values. The total cost of all schedule activities shall equal the Contract Price. The cost assigned to individual schedule Activities shall reflect the Contractor's cost for each activity, and shall not artificially inflate, imbalance, or front-load the items. Each activity shall identify a reasonable estimate of either a commodity or labor upon which the activity value is based.

At a minimum, each activity shall: (1) have a unique activity description and contain a verb; (2) be a duration of not more than 20 Working Days nor less than five Days unless otherwise authorized by MDOT; (3) have at least one predecessor and one successor activity, except for Project start and finish respectively; and (4) express activity durations in days.

The cost-loaded CPM Schedule shall be sufficiently detailed to accurately reflect the complexity and

numerous construction operations of this Project to the satisfaction of MDOT. The level of detail described below is the minimum level of detail required for schedule activities. The Contractor is encouraged to further develop the activities to reflect the Work.

Administration

- Schedule milestones
- Mobilization
- All Submittals (broken down by each deliverable)
- All design (broken down by each design package, Released For Construction Document package, etc.)
- MDOT review periods
- Utility notification and relocation, by Utility
- Material on hand (procured items) requests and payments
- Substantial completion
- Punch list
- Final Acceptance

General

- Soil erosion and sediment control measures
- Permit preparation and reviews
- Weather restrictions
- Open to traffic dates

Bridges

- Test piling
- Test holes
- Excavation for each substructure location
- Fabrication and delivery of piling
- Structural steel fabrication and delivery, per structure
- Pile installation, per bent, per structure
- Drilled shaft installation, per pier, per structure
- Pile caps, per bent, per structure
- Footings, per pier, per structure
- Columns, per pier, per structure
- Caps, per pier, per structure
- Abutments, per structure
- Beam or girder erection, per structure
- Diaphragms
- Deck placement, per structure
- Deck hydrodemolition, per structure
- Joint repair, per structure
- Concrete repairs, per structure
- Parapets, per structure
- Painting of existing structural steel
- Erection and removal of falsework and shoring

Roadway and Traffic

- Work zone signing and striping
- Traffic switches
- Submission of job mix formula for asphalt pavement
- Delivery of materials such as drainage pipe, guardrail, sign structures and signs, permanent lighting facilities, and permanent traffic signals

- Internal access and haul roads (location and duration in-place)
- Clearing and grubbing by stationing and roadway
- Excavation
- Embankment placed for each roadway
- Drainage – by run with structures for each roadway
- Retaining walls per location
- Subgrade for each roadway
- Base for roadway
- Curb, barrier wall, and sidewalks for each roadway
- Pavement (asphalt and/or concrete) for each roadway
- Bridge approach slabs per location
- Guardrail for each roadway
- Slope pavement or riprap
- Roadway lighting for each roadway
- Signing for each sign structure location and for each roadway
- Striping for each roadway
- Traffic signals per location
- Topsoil, sodding, seeding, and mulching for each roadway
- Landscaping
- Guardrail
- Fencing
- Crossover and temporary pavement removals
- Finishing roadway and final cleanup

2.3.9 Deliverables

Unless otherwise indicated, all deliverables shall be submitted in both electronic format and hardcopy format. The Contractor shall submit the following to MDOT:

Deliverable	For Acceptance or Approval	Number of Copies	Submittal Schedule	Reference Section
		Hardcopy Electronic		
Initial CPM Schedule	Acceptance	3	2 (one PDF and one MS Project)	At or prior to Preconstruction Meeting
Updated CPM Schedule	Acceptance	0	2 (one PDF and one MS Project)	Monthly or bi-monthly with Invoice

Clause Code:	038-PS-02
Clause Type:	Progress Schedule
Project Name:	Interstate 85/385 Interchange Improvements
Owner Name:	South Carolina DOT
Year Published:	2014

AGREEMENT

IV. CONTRACT TIME

A. Project Schedule

1. Time for Completion of Project. The Project shall be Substantially Complete within _____ calendar days from Notice to Proceed #21. Time is of the essence. SCDOT will establish two Notices to Proceed for the Project. The first notice to proceed shall be no later than 45 days from the effective date of the Agreement and will initiate all preconstruction and permitting activities in order to successfully secure all permits for the Project. The duration for these preconstruction and permitting activities has been established as 365 calendar days. SCDOT will only consider time extensions beyond this 365 calendar day timeframe subject to the provisions in Article IX of the Agreement. The second notice to proceed will initiate construction once the 404 permit secured. The second notice to proceed shall be issued no later than 45 days from the effective date of the 404 permit or 410 calendar days from the first notice to proceed, whichever comes first. The PROPOSER must identify the time required for the construction time of the Project on the Cost Proposal Bid Form. Final Completion shall be reached as defined in paragraph 5 below.

Contract Time shall be the number of calendar days from Notice to Proceed #1 to Notice to Proceed #2, not to exceed 410 calendar days, plus construction time as defined on the Cost Proposal Bid Form in Exhibit 1 and the time from Substantial Work Completion to Final Completion, not to exceed 180 days.

2. Substantial Work Completion. The Project shall be considered substantially complete when it is serviceable to the public, all lanes and ramps are open, and all work is completed except for “Project Close-out Activities”, “Project Close-out Activities” are defined as punch list items, site clean-up, demobilization, and final Project documentation, including but not limited to as-built plans.

3. Critical Path Method Schedule: CONTRACTOR shall prepare and maintain a schedule for the Project using the Critical Path Method of scheduling (hereinafter called “CPM Schedule”). Prepare the schedule in accordance with this agreement and the SCDOT Supplemental Specifications (**EXHIBIT 6**) with the following exceptions:

a) Submit to the SCDOT the initial baseline CPM schedule within 30 days from the Effective Date of this Agreement. No contract payment will be made to Contractor and no construction work may begin until a CPM baseline schedule is received and accepted by SCDOT. Update the baseline CPM schedule for monetary and quantitative quality tracking purposes as Released for Construction plans are developed.

- b) Cost-load the CPM schedule using the expenses identified in the schedule of values. Use the schedule of values to establish Expense Categories and assign to the correct activities.
- c) Include submittal activities. Allow duration for these activities to include SCDOT review periods.
- d) Reuse of deleted activity ID's from schedule update to schedule update is not allowed.
- e) Failure to include any element of work or any activity including but not limited to utility relocation, right of way acquisition, and permitting will not relieve the CONTRACTOR from completing all work within the Contract Time at no additional time or cost to the SCDOT, notwithstanding the acceptance of the schedule by SCDOT.
- f) Develop project specific calendars reflecting all seasonal restrictions included in this Agreement and non-work days. Address durations for weather within activity duration, not within the calendar.
- g) Use only a Work Breakdown Structure (WBS) to organize schedule activities. At a minimum, breakout the design and construction phases. These two breakouts should have the same parent within the structure.
- h) Submit monthly updates no later than 15 days following the most recent estimate period end date, whether or not an estimate was generated. Set the data date the same as the most recent estimate period end date.
- i) If SCDOT determines any schedule submission is deficient, it will be returned to the CONTRACTOR. A corrected schedule shall be provided within 7 calendar days from the SCDOT's transmittal date.
- j) The schedule may indicate an early completion date. However, SCDOT will not be liable in any way for CONTRACTOR's failure to complete the Project prior to the specified Contract Time. Any additional costs, including extended overhead incurred between CONTRACTOR's scheduled completion date and the Contract Time, shall be the responsibility of the CONTRACTOR.
- k) The schedule may include constraints to indicate the early completion of portions of the work. SCDOT will remove these constraints when determining the critical path of the schedule.
- l) Include in each narrative a detailed listing of crews utilized on activities and their responsibilities. In lieu of this, the Contractor may request to submit a Resource Loaded CPM schedule.

4. Progress Review Meetings.

- a) Review Meetings shall be held between CONTRACTOR and SCDOT at least every 2 weeks. Periodic construction meetings shall be held by CONTRACTOR with its consultants and subcontractors to coordinate the work, update the schedule, provide information and resolve potential conflicts.
- b) SCDOT and CONTRACTOR will hold a regular CPM Progress Meeting at which all principal parties are expected to attend. These meetings will be held the week before the application for payment is due so that job progress will coincide with the payment application. At this meeting, CONTRACTOR shall provide the most recent schedule with notations showing actual start dates, actual finish dates, and activity progress. If the schedule provided indicates an actual or potential delay to the completion of the Contract,

CONTRACTOR shall provide a narrative identifying the problems, causes, the activities affected and describing the means and methods available to complete the Project by the Contract Time.

5. Final Completion. When CONTRACTOR believes that all elements of its work on the Project, including all of the requirements of the Contract, have been completed, it shall notify SCDOT in writing. Final Completion shall be achieved within 180 calendar days of Substantial Work Completion as defined in this Agreement. Within thirty (30) days thereafter, SCDOT will acknowledge project completion or will advise CONTRACTOR in writing of any aspect of the Contract or the Project Scope that is incomplete or unsatisfactory. CONTRACTOR shall complete all corrective action within thirty (30) days after written notification of incomplete or unsatisfactory items. CONTRACTOR will notify SCDOT in writing upon completion of necessary corrective action. SCDOT will verify satisfactory completion of the corrective action in writing to CONTRACTOR. Upon verification, the Project shall be deemed to have achieved Final Completion.

6. Inspection/Acceptance; No Waiver. No inspection, acceptance, payment, partial waiver, or any other action on the part of SCDOT will operate as a waiver of any portion of this Agreement or of any power reserved herein or any right to damages or other relief, including any warranty rights, except insofar as expressly waived by SCDOT in writing. SCDOT will not be precluded or estopped by anything contained herein from recovering from CONTRACTOR any overpayment as may be made to CONTRACTOR.

<Omitted>

Refer also to:

EXHIBIT 6 - SUPPLEMENTAL SPECIFICATIONS AND FORMS, CONSTRUCTION SCHEDULES

Clause Code:	039-ACC-01
Clause Type:	Project Acceptance
Project Name:	SH-55 Gold Fork River Bridge
Owner Name:	Idaho DOT
Year Published:	2015

Design-Build Construction Administration Special Provision

112.14 Punch List Inspection

CQAM shall be responsible for punch list item acceptance. The punch list shall be maintained by the CQAM and shall be created near the end of the Project or at the time of written notice of project completion. The punch list inspection shall be performed on all definable features of the Work, against approved construction plans, specifications and other related construction and Contract documents and note any discrepancies thereof in accordance with the Contract and Department standards. The CQAM shall review the Project records to ensure that all items addressed by nonconformance reports, including areas where Department oversight identified discrepancies, have been corrected, or have been included on the punch list for corrective action.

112.15 Final Inspection

DBF PM, CM, CQAM, and Engineer will jointly conduct a final inspection of the project. The final inspection includes inspection of the completed Work, associated as-constructed documents, certifications and other documentation, and punch-list item review. The CQAM will ensure that each deficiency identified during the final inspection is corrected.

112.16 Final Acceptance

The Department has sole authority for final acceptance of all Work per 110.03.05 of the DB QM SP.

Clause Code:	040-ACC-02
Clause Type:	Project Acceptance
Project Name:	Lahaina Bypass 1B-2
Owner Name:	Central Federal Lands Highway Division
Year Published:	2015

Section 106. — ACCEPTANCE OF WORK

106.01 Conformity with Contract Requirements. Delete the text and substitute the following:

Follow the requirements of FAR Clause 52.246-12 Inspection of Construction. References to standard documents and test methods of AASHTO, ASTM, GSA, and other recognized standard authorities refer to the documents and methods in effect on the date of the Invitation for Bids (IFB) or Request for Proposal (RFP).

Use the FLH, *Field Materials Manual (FMM)*, *Appendix B: FLH Test Methods* in effect on the date of the IFB or RFP. Electronic copies of the FLH Test Methods and FHWA forms can be downloaded from:

<http://flh.fhwa.dot.gov/resources/manuals/fmm/>

Specification limits, tolerances, test results, and related calculations are according to ASTM E29, Absolute Method.

Perform work to the lines, grades, cross-sections, dimensions, and processes or material requirements, as provided by the DOR.

Incorporate manufactured material into the work according to the manufacturer's recommendations or to these specifications, whichever is stricter.

When standard manufactured items are specified (such as fence, wire, plates, rolled shapes, and pipe conduits that are identified by gauge, density, or section dimensions) the identification will be considered to be nominal masses or dimensions. Unless specific contract tolerances are noted, established manufacturing tolerances will be accepted.

Plan dimensions and contract specification values are the values to be strived for and complied with as the design values from which deviations are allowed. Perform work and provide material that is uniform in character and reasonably close to the prescribed value or within the specified tolerance range. The purpose of a tolerance range is to accommodate occasional minor variations from the median zone that are unavoidable for practical reasons.

The Government may inspect, sample, or test work before final acceptance of the project. If the Government tests work, copies of test reports are furnished to the Contractor upon request. Government tests may or may not be performed at the work site.

Do not rely on the availability of Government test results for process control.

Remove and replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted, at no cost to the Government.

(a) Disputing Government test results. If the accuracy of Government test results is disputed, promptly inform the CO. If the dispute is unresolved after reasonable steps are taken to resolve the dispute, further evaluation may be obtained by written request. Include a narrative describing the dispute and a proposed resolution protocol that addresses the following:

- (1) Sampling method
- (2) Number of samples
- (3) Sample transport
- (4) Test procedures
- (5) Testing laboratories
- (6) Reporting
- (7) Estimated time and costs
- (8) Validation process

(b) Alternatives to removing and replacing non-conforming work. As an alternative to removal and replacement, the Contractor may submit a written request to:

- (1) Have the work accepted at a reduced price; or
- (2) Be given permission to perform corrective measures to bring the work into conformity.

The request must contain supporting rationale and documentation. Include references or data justifying the proposal based on an evaluation of test results, effect on service life, value of material or work, quality, aesthetics, and other tangible engineering basis. The CO will determine disposition of the nonconforming work.

Add the following after (b):

The number of significant figures used in the calculations will be according to ASTM E 29, absolute method.

Where sample/testing procedures make reference to AASHTO, ASTM, or other standards (designated as FLH T), the procedure as modified in the CFLHD Materials Manual shall govern. Where the specifications make reference to AASHTO Test T11, "Procedure B - Washing Using a Wetting Agent" shall be the procedure followed.

Where the specifications make reference to AASHTO Test T310, "Direct Transmission Method of In-Place Nuclear Density and Moisture Content" shall be the procedure followed.

106.02 Visual Inspection. Delete the Subsection and substitute the following:

106.02 Visual Inspection. Acceptance is based on visual inspection of the work for compliance with the contract requirements. In the absence of specific contract requirements or tolerances, use prevailing industry standards.

106.03 Certification. Add the following after the second paragraph:

See Table 106-3 for schedule for full or partial acceptance by material certification. Submit certification and sample of material for testing as required.

Delete the third bullet of the third paragraph and substitute the following:

Contractor signed certification stating “to the best of our knowledge the materials certified by the attached certification represent the materials incorporated into the work of this contract”; and

Table 106-3 Schedule For Full or Partial Acceptance by Materials Certification. Add Table 106-3 following Table 106-2.

<Omitted>

Clause Code:	041-ACC-03
Clause Type:	Project Acceptance
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

ARTICLE 2. CONTRACT TIME

Article 2.4. Final Acceptance

This Project's Final Acceptance Deadline shall be no later than _____, 20__. Final acceptance shall occur no later than the Project Completion Date.

When in the opinion of the Department's Project Manager the Design-Builder has fully performed the Work under this Contract, the Department's Project Manager shall recommend to the Regional Director and the Commissioner of Transportation the Final Acceptance of the Work so completed. If the Commissioner accepts the recommendation of the Department's Project Manager, he/she shall thereupon by letter notify the Design-Builder of such Final Acceptance, and copies of such Final Acceptance shall be sent to other interested parties.

Final Acceptance shall be final and conclusive except for: defects not readily ascertainable by the State; actual or constructive fraud; gross mistakes amounting to fraud; other errors which the Design-Builder knew or should have known about; or the State's rights under any Warranty or guarantee. Final Acceptance may be revoked by the State at any time prior to the issuance of the final check by the New York State Office of the Comptroller upon the State's discovery of such defects, mistakes, fraud, or errors in the Work.

Clause Code:	042-NCW-01
Clause Type:	Non-conforming Work
Project Name:	TH 371 Four Lane Expansion Design-Build Project
Owner Name:	Minnesota DOT
Year Published:	2015

PROJECT REQUIREMENTS

BOOK 2 Section 5 Quality Management

5.2.2 MnDOT Role

MnDOT will perform design auditing and Acceptance of Released for Construction Documents, construction quality acceptance testing and inspection (including acceptance at Critical Activity points) to verify that the Work meets Contract requirements, independent assurance sampling and testing, and auditing of the Contractor's management system.

Auditing will entail the collection and documentation of objective evidence to verify whether requirements have been met. The results of auditing will be documented on standardized audit report forms with copies provided to the Contractor. Non-conformances will be communicated and tracked in separate reports. The audit results will also be recorded in a database, and regular summary and status reports will be provided to the Contractor. The timing, frequency, and depth of auditing will be at MnDOT's discretion.

At any time as deemed necessary at the sole discretion of MnDOT, MnDOT oversight staff may perform inspections or take samples for further investigation of possible non-conforming Work.

If MnDOT determines that the Contractor is not providing adequate Quality Control or Quality Assurance per the QM, the Contractor's Quality Control and Quality Assurance staff must be on-site at all times to perform audits, inspections, and other quality activities until the Contractor meets the QM requirements. MnDOT may also seek non-recoverable reimbursement for MnDOT and other party additional costs and impacts per Book 1, Section 5.7.2.

<Omitted>

5.4 Quality Manual

5.4.1 General

Ensure that the quality management system contains a QM that encompasses all Contract requirements with regard to design, construction, and documentation for all quality processes.

The QM must:

<Omitted>

Describe how the Contractor plans to deal with discovered non-conformances, tracking non-conformances, resolving non-conformances, and preventing similar non-conformances from occurring on future Work within the Project

<Omitted>

5.4.5 Construction

<Omitted>

5.4.5.2.1 Review and Disposition of Non-conforming Product

Ensure that non-conformances identified during the design verification and checking, or construction testing, and inspection activities are recorded. Resolve all non-conformances, including those of Subcontractors or Suppliers. Within five Days of the identification of a design-related non-

conformance by MnDOT, propose a resolution for MnDOT's Acceptance or Approval. Following Acceptance or Approval of the proposed resolution by MnDOT, notify MnDOT 24 hours prior to implementing the proposed solution so that MnDOT may witness the implementation (should MnDOT so choose).

5.4.5.2.2 Corrective and Preventive Action

The QM describes the corrective and preventive actions the Contractor will take upon the identification of actual or potential major and systemic non-conformances, identified internally or by MnDOT. Review the cause of major and systemic non-conformances and develop corrective action to prevent recurrence. Document proposed corrective action in a format and medium acceptable to MnDOT. Advise MnDOT when the corrective action has been implemented so MnDOT may verify the implementation (should MnDOT so choose). Within five Days of the identification of a major or systemic problem by either Contractor or MnDOT staff, propose to MnDOT, for Approval, a corrective or preventive action to prevent the recurrence of the problem. Update the quality management system to incorporate the Approved corrective action.

<Omitted>

5.4.9 Construction Requirements

5.4.9.2 Review and Disposition of Non-Conforming Product

Ensure that non-conformances identified during the design verification and checking, testing, and inspection activities are recorded. Ensure the resolution of all non-conformances, including those of Subcontractors or Suppliers.

Within five Days of the identification of a construction-related non-conformance by MnDOT, propose a resolution for MnDOT's Acceptance or Approval.

Following Acceptance or Approval of the proposed resolution by MnDOT, notify MnDOT 24 hours prior to implementing the proposed solution so that MnDOT may witness the implementation (should MnDOT so choose).

5.4.9.3 Corrective and Preventive Action

5.4.9.3.1 General

The QM describes the corrective and preventive actions the Contractor will take upon the identification of actual or potential major and systemic non-conformances, identified internally or by MnDOT.

Review the cause of major and systemic non-conformances and develop corrective action to prevent recurrence. Document proposed corrective action in a format and medium acceptable to MnDOT. Advise MnDOT when the corrective action has been implemented so MnDOT may verify the implementation (should MnDOT so choose).

5.9.3.2 Corrective and Preventive Action

Within five Days of the identification of a major or systemic problem by either Contractor or MnDOT staff, propose to MnDOT, for Approval, a corrective or preventive action to prevent the recurrence of the problem. Update the quality management system to incorporate the Approved corrective action.

Clause Code:	043-NCW-02
Clause Type:	Non-conforming Work
Project Name:	SH-55 Gold Fork River Bridge
Owner Name:	Idaho DOT
Year Published:	2015

Design-Build Construction Administration Special Provision

112.12 Nonconforming Construction Work

DBF shall develop and implement procedures in the QMP for addressing construction deficiencies in the Work. Include recovery measures necessary to commence correction of such nonconforming work, including the correction, removal or replacement of the nonconforming work and any damage caused to other parts of the Work affected by the nonconforming work.

The procedures shall define methods and responsibilities for identification, documentation, control, and processing of nonconforming items. A nonconformance exists when equipment, parts, materials or services exhibit deficiency in physical characteristics, functional performance, or documentation. Apply nonconformance procedures to all items, including actions associated with installation and construction which fail to conform (as specified or to other product description).

Where deficiencies in the Work can be corrected, the CQAM shall cause performance of such corrective action as is appropriate. Re-tests or inspections shall be made by the CQAM to determine the acceptability of the materials after corrective measures have been taken. The cost of removing, replacing or correcting defects in the materials will be the sole responsibility of the DBF at no additional cost to the Department. The cost of repairing or replacing other materials or Work damaged by the removal, replacement or correction of defects in the workmanship and materials shall be the sole responsibility of the DBF at no additional cost to the Department.

DBF shall develop a Nonconformance Report (NCR) form to document and provide the following information:

- Nonconformance identification
- Documentation
- Evaluations/recommendations
- Separation/removal/tagging
- Recommendation for “repair” or “use as is” dispositions
- Cause of nonconformance
- Proposed corrective action to prevent recurrence
- Responsibility for accomplishing corrective action
- Schedule for resolution

DBF shall develop and maintain a NCR log to enable tracking of nonconformances, and provide

the Engineer access to the tracking system. Include necessary information to trace nonconformance back to initial documentation and to summarize status.

DBF shall respond to the NCRs by date specified on NCR and include investigative actions, causes of nonconformances, how nonconformances were addressed, and corrective actions taken. Dispositions of "use as is" and "repair" for nonconforming items require review and acceptance by the Engineer and concurrence by the DM and CQAM.

Any deficient condition, whether the result of poor workmanship, use of materials containing defects, damage through carelessness or any other cause, found by, or disclosed to, the CQAM and/or the Department shall be removed and replaced by Work and materials which conform to the Contract or shall be remedied unless otherwise agreed upon by the Department. Upon failure on the part of the DBF to comply promptly with any order to remedy, remove or replace Work which is nonconforming or contains defects, the CQAM will notify the DBF PM and the Engineer that payment shall be withheld for the non-conforming work.

The Engineer may also cause such nonconforming work or deficiency to be remedied or removed and replaced by separate contractors employed by the Department at the DBF's expense. In such event, the costs of such removal, remediation and replacement shall be deducted from any monies due or to become due DBF under the Contract.

In the event the CQAM and/or Department finds, as a result of monitoring of the DBF construction work activities that any materials, equipment or the finished product in which materials, equipment or finished product are used are not in conformity with the Contract requirements, the Department may elect in its sole discretion to accept otherwise unacceptable Work as specified in 105.03 of the Standard Specifications.

Clause Code:	044-TC-01
Clause Type:	Traffic Control
Project Name:	Improvements to Interstate 55 Lincoln and Pike Counties, Mississippi
Owner Name:	Mississippi DOT
Year Published:	2013

17.0 MAINTENANCE OF TRAFFIC DURING CONSTRUCTION

The Contractor shall develop and submit a Maintenance of Traffic (MOT) Plan for MDOT approval at least 30 Days prior to beginning the first phase or stage of construction at each location. The MOT Plan shall identify the Contractor's strategy to provide for the safe and efficient movement of people, goods and services through and around each location while minimizing impacts to local residents, business and commuters; its approach to developing detailed Traffic Control Plans (TCP); Contractor shall describe the MOT Plan with reasonable and measurable tasks and milestones.

All regulatory, warning, route marker, guide and information signs, mounting requirements and vertical and horizontal clearances shall conform to the MUTCD and MDOT Standard Plans, and the requirements specified herein. Design and placement of signs shall consider future roadway widening.

17.1 Traffic Control Plans

The Contractor shall develop and submit Traffic Control Plans for each stage of construction on each Project Bridge that shows the Contractor's proposed construction staging and proposed traffic control devices consistent with the MOT Plan. The TCP shall be submitted for approval to MDOT three (3) days prior to construction of the Work shown in the TCP. Major revision to a TCP shall also be submitted to MDOT for its approval. The TCPs shall include, at a minimum, the following:

1. A detailed diagram showing the location of all traffic control devices.
2. An access maintenance plan for all properties requiring access during construction. The plan shall also indicate the areas where equipment will be stored and vehicles parked if within the Project Right-of-Way.
3. A plan for maintaining and controlling pedestrian, bicycle and other non-vehicular traffic.

17.2 Temporary Pavement Marking

Temporary Pavement markings shall be designed in accordance with the MUTCD and MDOT Standard Drawings. Type 1 Pavement Marking Tape shall be used for all temporary pavement markings on final pavement surfaces of the project. Temporary raised pavement markers are required for temporary lane shifts.

17.3 Construction Requirements

1. The Contractor shall maintain two (2) eleven (11) foot lanes on I-55 at all times in each direction (northbound and southbound) from July 1 through November 1. From November 2 to June 30 the Contractor shall maintain one (1) twelve (12) foot lane in each direction (northbound and southbound) on the existing structures at all times. Exceptions for temporary closures (NTP 824) may be granted for the erection of bridge girders and setting of protective barriers for the construction zones.
2. The Contractor shall notify MDOT of any lane closures necessary to perform work at each location prior to instituting or changing such traffic control measures. This notification shall be submitted at least 48 hours prior to the construction. Total road closures will not be permitted.

3. The Contractor shall notify MDOT of any vertical clearance reduction that provides less than 16.5' clearance, any load capacity reductions, or any width reduction that results in a restriction of less than 20' wide a minimum of 20 days prior to such restriction.
4. The Contractor shall provide a paved surface for all detours or bypasses.
5. The Contractor's placement of construction equipment, materials and vehicles shall comply with MUTCD.
6. SR 24/US 98 may be reduced to a two-lane/two-way head-to-head configuration in order to achieve required vertical clearance for a maximum of 6 weeks. Additional temporary closures may be granted for the erection of bridge girders, driving of piles, and setting of protective barriers for the construction zones. The Proposer will be assessed a penalty of \$1,000 per day for each full or partial day SR 24/US 98 remains in a two-lane/two way operation in excess of 42 calendar days.
7. Wide loads will be detoured from I-55 to US 51 when the I-55 roadway travel way is less than 17'-0". The Contractor shall prepare the detour plans and detour signing.
8. Traffic on the interchange loops should be diverted to the ramps prior to reducing SR 24 to a 2-lane/2-way operation.
9. The traffic signal at I-55 SB Ramps/SR 24 should be operational when the ramps are realigned to a new intersection with SR 24.
10. If SR 24 is reduced to a 2-lane/2-way operation, one of the 2 lanes in the new dual left turn lane on the I-55 SB exit ramp should be temporarily closed until the 4-lane operation is re-established.
11. The overhead signs on the trusses should be covered or removed prior to removing the interchange loops.
12. Overhead trusses [. . .] SR 24 shall be removed below the ground line. The trusses will become the property of the Proposer.

17.4 Protective barriers for the construction zone shall be anchored to the existing bridge decks per Section 15.4.11. Emergency Events

The Interstate system is a vital link in the evacuation of residents along the coast in the event of a Hurricane. In the event of a hurricane, the Contractor shall assist MDOT in maintaining an open highway system. This assistance will be paid for under a Supplemental Agreement.

17.5 Bearing Replacement

The Interstate system may be closed between the hours of 8 PM and 6 AM to raise and lower the bridge to replace the bearings. The closure period shall be limited to fifteen (15) minute intervals. The Contractor shall provide appropriate advanced warning to the traveling public such that they may either continue on the Interstate or exit the Interstate. No detour route will be required.

The Contractor shall obtain approval in writing from the MDOT Project Engineer of all Interstate closures prior to providing advanced warning to the public.

The Contractor shall provide seven (7) days advanced warning of the closures to the public.

17.6 Deliverables

At a minimum, the Contractor shall submit the following to MDOT for review or comment:

Deliverable	Review and Comment	Schedule	Reference Section
Maintenance of Traffic Plan	✓	30 Days prior to start of construction	17
Traffic Control Plans	✓	At least 3 days prior to construction of the Work shown in the TCP submittal	17.1

Clause Code:	045-TC-02
Clause Type:	Traffic Control
Project Name:	US 90 (I-49 South) Albertson's Parkway to Ambassador Caffery Design-Build Project
Owner Name:	Louisiana DOT
Year Published:	2013

PART 3 – PERFORMANCE SPECIFICATIONS

APPENDIX A

MAINTENANCE DURING CONSTRUCTION PERFORMANCE SPECIFICATION

1.0 INTRODUCTION

The Design-Builder shall develop and implement a Maintenance Plan for the existing US 90 (I- 49 South), Highway LA 182, frontage roads and all intersecting streets in the project corridor that meets or exceeds the performance goals and measures as outlined in this Maintenance During Construction Performance Specification. This Maintenance Plan shall include thresholds for remedial work, remediation actions that need to be taken when thresholds are crossed and timelines to address deficiencies.

2.0 PERFORMANCE GOALS

The Design-Builder shall meet the following performance goals: A) The roadway and shoulders, including pavement and bridge decks, must be maintained in a safe, smooth, debris free condition; B) All roadside features, appurtenances, and devices, including, but not limited to, drainage structures, guard rail, and permanent signs must be maintained in a manner that allows these items to function as intended; C) The roadside vegetation must be maintained in a manner that allows the side slopes, end slopes, and ditches to function as intended and provide a pleasing aesthetic appearance which does not impede drainage or any other function of roadside features, appurtenances, or devices; and D) Litter and other roadside debris must be managed to maintain a pleasing, aesthetic appearance and to allow for the safe movement of traffic.

3.0 STANDARDS AND REFERENCES

The Design-Builder shall plan, design, construct, and implement the Project in accordance with this Maintenance During Construction Performance Specification and the requirements of the following standards. Standards and references specifically cited in the body of this Maintenance During Construction Performance Specification establish requirements that have precedence over all others. In this Maintenance During Construction Performance Specification, if the requirements in any standard conflict with those in another, the standard highest on the list will govern. Listed under references are guidelines that the Design-Builder may use in addressing the requirements as the Design-Builder sees fit. It is the Design-Builder's responsibility to obtain clarification of any ambiguity within this Maintenance During Construction Performance Specification prior to proceeding with design or construction.

4.0 STANDARDS

The standards for this Maintenance During Construction Performance Specification are listed in descending order of precedence. In case of conflict between or among standards, the order of precedence established by the LA DOTD will govern. A) Manual on Uniform Traffic Control Devices (MUTCD), 2009. B) The Louisiana Department of Transportation and Development's Guardrail Design Standards (GR-200 and GR-201). C) The Louisiana department of Transportation and Development's Traffic Signal Manual, Release Version 1.0, 11-29-2012. D) The Louisiana Department of Transportation and Development's Maintenance Manual. (LA DOTD Maintenance is currently revising this manual. If version REV. JULY 1, 1986 of this manual is used, disregard page M6-16); E) Engineering Directives and Standards Manual (EDSM), LA DOTD.

5.0 REFERENCES

The version of the following references in effect on the Proposal due date may apply: A) The American Association of State Highway and Transportation Officials' (AASHTO) Maintenance Manual for Roadways and Bridges (2007) and B) The American Association of State Highway and Transportation Official's Roadside Design Guide 3rd Edition 2006.

6.0 SCOPE

Within the corridor Project limits, the Design-Builder shall provide all necessary maintenance of the existing US 90 (I-49 South) roadway, streets, frontage roads, highways, bridges, and all associated roadside features, including, but not limited to, permanent signs, guardrail, vegetation, and drainage structures for the duration of the Design-Build (DB) Contract.

7.0 PERFORMANCE MEASURES

The Design-Builder's performance will be evaluated in accordance with the measures identified in Sections 7.1 through 7.7 below. The Department or their designee will perform monthly reviews on all measures. The Design-Builder will take immediate necessary corrective measures for any deficiencies noted in the monthly reviews.

7.1 PAVEMENT (TRAVEL LANES, DETOUR ROADS, CROSSOVERS AND SHOULDERS)

The following measures will be used to evaluate pavement maintenance during construction:

- A) Surface defects;
- B) Drainage aspects;
- C) Pavement and shoulder edge conditions;
- D) Rutting;
- E) Joints and cracking;
- F) Ride quality;
- G) Friction;
- H) Timeliness of repair strategy;
- I) Striping; and
- J) Debris removal.

7.2 BRIDGES AND STRUCTURES

The following measures will be used to evaluate bridge and structures maintenance during construction:

- A) Surface defects;
- B) Drainage aspects;
- C) Joints and cracking;
- D) Ride quality;
- E) Friction;
- F) Timeliness of repair strategy;
- G) Debris removal; and
- H) Striping.

Approval for repairs and/or replacement of bridge or structures must be obtained from the Department's Project Manager prior to Work being performed.

7.3 PIPES, CULVERTS, AND MISCELLANEOUS DRANAGE STRUCTURES (SUCH AS, CATCH BASINS, DROP INLETS AND MEDIAN DRAINS)

The following measures will be used to evaluate pipe, culvert, and miscellaneous structure maintenance during construction:

- A) Effectiveness and function;
- B) Debris/vegetation;
- C) Erosion/scour;
- D) Structural condition; and
- E) Flooding.

7.4 RETAINING WALLS

The following measures will be used to evaluate retaining wall maintenance during construction:

- A) Effectiveness and function;
- B) Debris/vegetation;
- C) Erosion/scour; and
- D) Structural condition.

7.5 GUARDRAIL

The following measures will be used to evaluate guardrail maintenance during construction:

- A) Effectiveness and function; and
- B) Timeliness of repair strategy. Approval for repairs and/or replacement of guardrail must be obtained from the Department's Project Manager prior to Work being performed.

7.6 PERMANENT SIGNS

The following measures will be used to evaluate permanent sign maintenance during construction:

- A) Visibility and legibility during daytime and nighttime;
- B) Timeliness of repair strategy;
- C) Functionality; and
- D) Debris.

7.7 ROADSIDE VEGETATION

The following measures will be used to evaluate roadside vegetation maintenance during construction:

- A) Maintenance of primary turf height;
- B) Landscaped areas and all other roadside vegetation; and
- C) Control of noxious weeds and the collection/disposal of litter.

7.8 TRAFFIC SIGNALS

The following measures will be used to evaluate traffic signals during construction:

- A) Maintenance Requirements
- B) Signal Indications (LED)
- C) Signal Head and Sign Alignment
- D) Controller
- E) Flasher Unit
- F) Video Detection
- G) Interconnect Equipment
- H) Cabinet Condition
- I) Service and Pedestal Disconnects
- J) Support Poles/mast Arms
- K) Underground Junction Boxes
- L) Programming (Controller vs. TSI)

8.0 REQUIREMENTS

8.1 LICENSES AND SPECIAL TRAINING

A) Pesticide Applicator

The Design-Builder shall possess, or employ a person who possesses, a Louisiana Department of Agriculture and Forestry (LD&F) Commercial Pesticide Applicator License, within the Right-of-Way (ROW) usage and turf and ornamental category, to apply pesticide/herbicide within the highway system, as required. The Design-Builder shall provide the LA DOTD with documentation of the Commercial Pesticide Applicator License prior to beginning Work.

Mixing, transporting, handling, spraying, and disposal of materials must be done by licensed personnel.

B) Aquatic License

The Design-Builder shall possess an aquatic license to make pesticide applications to target species located in bodies of water.

Clause Code:	046-WA-01
Clause Type:	Warranty
Project Name:	I-15 Cajon Pass Rehabilitation Design-Build Project
Owner Name:	California DOT
Year Published:	2013

8 SURETY BONDS

<Omitted>

8.2 Warranty Bond

After Final Acceptance has occurred, Design-Builder may obtain a release of the Performance Bond by providing to Department and maintaining full force and effect a warranty bond which shall guarantee performance of all obligations of Design-Builder that survive Final Acceptance under the Contract Documents. The warranty bond (a) shall be in an amount equal to four percent of the Contract Price during the first two years following Final Acceptance and shall be in an amount equal to two percent of the Contract Price during the third year following Final Acceptance and (b) shall be in the form set forth in Exhibit M.

<Omitted>

21 WARRANTIES

21.1 Warranties by Design-Builder

21.1.1 Project Warranties

Design-Builder warrants that:

- (a) all design Work furnished pursuant to the Contract Documents shall conform to all professional engineering principles generally accepted as standards of the industry in the State;
- (b) the Project shall be free of defects (including design defects except to the extent that such defects are inherent in prescriptive specifications included in the Contract Documents, unless (i) Design-Builder has actual or constructive knowledge of such defects and (ii) Design-Builder fails to request a change thereto by Department);
- (c) materials and equipment furnished under the Contract Documents shall be of good quality and, when installed, shall be new;
- (d) the Work shall meet all of the requirements of the Contract Documents;
- (e) the specifications and/or drawings selected or prepared for use during construction are appropriate for their intended use; and
- (f) the Project shall be fit for use for the intended function pursuant to and in accordance with the specifications of the Contract Documents.

21.1.2 Project Warranty Term

The Warranty term shall commence upon Substantial Completion or, if earlier, upon final acceptance of specific elements of the Project by a third party owner. Subject to extension under Section 21.2 and notwithstanding any shorter warranty term for specific Project elements that may be set forth elsewhere in the Contract Documents, the Warranties regarding structures and pavements of the Project shall remain in effect until three years after Substantial Completion. The warranties regarding all other elements of the Project shall remain in effect until two years after Final Acceptance.

If Department determines that any of the Work has not met the standards set forth in this Section 21.1 at any time within the Warranty period, then Design-Builder shall correct such Work as specified below, even if the performance of such corrective work extends beyond the stated warranty period.

21.1.3 Reserved

21.1.4 Corrective Work

Department and Design-Builder shall conduct a walkthrough of the Site together at least one time per year prior to the expiration of the Warranty period. On each walkthrough, Department will produce a punch list of items requiring Warranty Work. In addition, Department reserves the right at any time during the Warranty period to identify Work that fails to meet the warranty.

Design-Builder may also monitor the Site using non-destructive testing for any Warranty Work required during the Warranty period. Design-Builder shall provide advance notification to Department of all monitoring dates and times.

Department will notify Design-Builder of any failure of any of the Work that is Design-Builder's, or any Subcontractor's, responsibility to correct under the terms of the Warranty. Design-Builder shall correct any areas which exceed the warranty threshold limits established for the Project. Department may require corrective actions at any time within the Warranty period, or defer corrective action until the end of the initial Warranty period.

For all corrective actions required, Design-Builder shall provide a written proposal for performing Warranty Work within 10 Working Days from receiving notification from Department that corrective work is required. Design-Builder shall also provide a written proposal for performing the corrective Work if Design-Builder elects to perform this Work based on Design-Builder's assessment of the Site.

The proposal shall include, as a minimum:

- (a) The proposed construction remedy;
- (b) The proposed schedule for prosecution and completion of the Work; and
- (c) The proposed traffic management plan.

Department shall respond as to the adequacy and suitability of the proposal within 10 Working Days of the date of Design-Builder's submittal. Department may agree to Accept Nonconforming Work in accordance with Section 5.7.2. During the Warranty period, Design-Builder will not be held responsible for distresses caused by identifiable factors unrelated to materials and workmanship. Upon written request from Design-Builder and on a case-by-case basis, Department will consider other factors that appear to be beyond the control of Design-Builder and may relieve Design-Builder from its Warranty obligations with respect thereto. Design-Builder shall commence corrective action Work within 30 Calendar Days after notice by Department of acceptance of the written plan for warranty correction. If the Work cannot be started then because of seasonal limitations, Design-Builder must so notify Department and submit (for Department approval) a schedule for completion of the corrective action Work. If Design-Builder does not use its best efforts to proceed to effectuate that corrective action Work within the agreed time, or if Design-Builder and Department fail to reach such an agreement, Department, after notice to Design-Builder, shall have the right to perform or have performed by third parties the necessary remedy, and the costs thereof shall be borne by Design-Builder. Design-Builder shall be responsible for the inspection and testing of the Warranty Work. If Department determines that emergency repairs are necessary for public safety, Department may perform the corrective Work. Any such emergency repairs will be authorized by Department Project Manager, or his/her representative. Prior to making the emergency repairs, Department will document the basis for the emergency action, and will preserve evidence, such as photographs or videotapes, of the defective condition. Emergency repairs will be coordinated with Design-Builder when possible. All costs associated with the emergency repairs that are covered by the Warranty Work shall be borne by Design-Builder.

21.1.5 Costs of Correction of Work

All costs of correcting such rejected Work, including additional testing and inspections, shall be deemed included in the Contract Price. Design-Builder shall reimburse Department and pay Department's expenses made necessary thereby within 10 Days after Design-Builder's receipt of

invoice therefor. Design-Builder shall be responsible for obtaining any required Governmental Approvals or other consents from any other Person in connection with the Warranty Work.

21.2 Warranty of Corrected Work

The Warranties shall apply to all Work redone, repaired, corrected or replaced pursuant to the terms of the Contract. The Warranties as to each redone, repaired, corrected or replaced element of the Work shall extend beyond the original warranty period if necessary to provide at least a one-year warranty period following Acceptance thereof by Department or acceptance thereof by the appropriate Person who will own such element.

21.3 Subcontractor Warranties

21.3.1 Assignment

Without in any way derogating Design-Builder's own representations and warranties (including the Warranties) and other obligations with respect to all of the Work, Design-Builder shall obtain from all Subcontractors and cause to be extended to Department, appropriate representations, warranties, guarantees and obligations with respect to the design, materials, workmanship, equipment, tools and supplies furnished by such Subcontractors, including all such representations, warranties, guarantees and obligations required to be furnished by Subcontractors under Book 2. All representations, warranties, guarantees and obligations of Subcontractors (a) shall be written so as to survive all Department and Design-Builder inspections, tests and approvals, and (b) shall run directly to and be enforceable by Design-Builder and/or Department and their respective successors and assigns. Design-Builder hereby assigns to Department all of Design-Builder's rights and interest in all extended warranties for periods exceeding the applicable Warranty period which are received by Design-Builder from any of its Subcontractors.

21.3.2 Enforcement

Upon receipt from Department of notice of a failure of any of the Work to satisfy any Subcontractor warranty, representation, guarantee, or obligation, Design-Builder shall enforce or perform any such representation, warranty, guarantee or obligation, in addition to Design-Builder's other obligations hereunder. Department's rights under this Section 21.3.2 shall commence at the time such representation, warranty, guarantee or obligation is furnished, and shall continue until the expiration of Design-Builder's relevant Warranty (including extensions thereof under Section 21.2). Until such expiration, Design-Builder shall be responsible for the cost of any equipment, material, labor (including re-engineering) or shipping, and Design-Builder shall be required to replace or repair defective equipment, material or workmanship furnished by any Subcontractor.

21.4 No Limitation of Liability

The foregoing warranties are in addition to all rights and remedies available under the Contract Documents or applicable law, and shall not limit Design-Builder's liability or responsibility imposed by the Contract Documents or applicable law with respect to the Work, including liability for design defects, latent construction defects, strict liability, negligence or fraud; provided, however, that, upon expiration of the Warranties, Design-Builder shall have no further liability to Department hereunder for patent construction defects.

21.5 Warranty Beneficiaries

In addition to benefiting Department and its successors and assigns, the Warranties and Subcontractor

warranties provided under this Section 21 shall inure to the benefit of, and shall be directly enforceable by, any local agencies and Utility Owners with respect to those portions of the Work owned or controlled by each such Person.

21.6 Remedies for Breach of Warranty

In addition to Department's other rights and remedies hereunder, at law or in equity, Design-Builder shall be liable for actual damages resulting from any breach of an express or implied warranty or any defect in the Work.

21.7 Disputes

Any disagreement between Department and Design-Builder relating to this Section 21 shall be subject to the dispute resolution provisions contained in Section 19, provided that Design-Builder shall proceed as directed by Department pending resolution of the dispute.

Clause Code:	047-WA-02
Clause Type:	Warranty
Project Name:	Kosciuszko Bridge Project – Phase 1
Owner Name:	New York State DOT
Year Published:	2013

DB SECTION 104

SCOPE OF WORK

<Omitted>

DB 104-15 WARRANTIES AND GUARANTEES

DB 104-15.1 Warranties

The Design-Builder warrants as follows:

- A) That all design Work performed pursuant to the Contract Documents, including that done by its Subcontractors and manufacturers, shall conform to all professional engineering principles generally accepted as standards of the industry;
- B) That the Project shall be free of defects including design defects, errors, and omissions and shall be fit for use for the intended function; and
- C) That all materials and equipment furnished under the Contract Documents shall be of good quality and new.

In addition, the Department may require, subject to express agreement in writing between the Department and the Design-Builder, with approval from the FHWA when required, warranties associated with the contract for limited circumstances. A prototype warranty specification is available from the Department for the purpose of the Design-Builder's providing a warranty for a particular item, as opposed to providing a warranty for an entire contract. The product warranty will be developed between the Department and the Design-Builder with input from appropriate technical experts and the Office of Legal Affairs Division in conjunction with the Office of Construction Division, and incorporated into the contract via order-on-contract. The warranty may be used in situations including, but not limited to, work performed not in full compliance with the contract documents, where initial testing does not indicate any deficiency in the end product.

If the Department determines that any of the Work has not met the standards set forth in this DB §104-15 at any time during the Warranty period for such Work, then the Design-Builder shall correct such Work as specified below even if the performance of such correction Work extends beyond the stated Warranty period.

Within seven days of receipt by the Design-Builder of notice from the Department specifying a failure of any of the Work to satisfy the Design-Builder's Warranties, or of any Subcontractor representation, warranty, guarantee, or obligation which the Design-Builder is responsible to enforce, the Design-Builder and the Department shall mutually agree when and how the Design-Builder shall remedy such violation, provided, however, that in case of an emergency requiring immediate curative action, the Design-Builder shall implement such action as it deems necessary and shall notify the Department of the urgency of a decision. The Design-Builder and

the Department shall agree on a remedy immediately upon notice by or to the Department of such emergency. If the Design-Builder does not use its best efforts to proceed to effectuate such remedy within the agreed time, or if the Design-Builder and the Department fail to reach such an agreement within such seven-day period (or immediately, in the case of emergency conditions), then the Department, upon notice to the Design-Builder, shall have the right to order the Design-Builder to perform the work or to perform or have performed by third parties the necessary Department-approved remedy, and the costs thereof shall be borne by the Design-Builder.

DB 104-15.2 Warranty Period

Warranties for all Work shall commence upon Project Completion and shall remain in effect until two years after the date that Final Acceptance is achieved. If the Department determines that any of the Work has not met the standards set forth in this DB §104-15 at any time during the Warranty period for such Work, then the Design-Builder shall correct such Work as specified below even if the performance of such correction Work extends beyond the stated Warranty period.

Within seven days of receipt by the Design-Builder of notice from the Department specifying a failure of any of the Work to satisfy the Design-Builder's Warranties, or of any Subcontractor representation, warranty, guarantee, or obligation which the Design-Builder is responsible to enforce, the Design-Builder and the Department shall mutually agree when and how the Design-Builder shall remedy such violation, provided, however, that in case of an emergency requiring immediate curative action, the Design-Builder shall implement such action as it deems necessary and shall notify the Department of the urgency of a decision. The Design-Builder and the Department shall agree on a remedy immediately upon notice by or to the Department of such emergency. If the Design-Builder does not use its best efforts to proceed to effectuate such remedy within the agreed time, or if the Design-Builder and the Department fail to reach such an agreement within such seven-day period (or immediately, in the case of emergency conditions), then the Department, upon notice to the Design-Builder, shall have the right to order the Design-Builder to perform the work or to perform or have performed by third parties the necessary Department-approved remedy, and the costs thereof shall be borne by the Design-Builder.

DB 104-15.3 Manufacturer Warranties and Guarantees

The Design-Builder shall provide to the Department or the authority having jurisdiction of the facility any manufacturer's warranties and guarantees normally given as customary trade practice. For contracts involving the furnishing and/or installing of electrical and mechanical equipment, the Design-Builder shall guarantee the satisfactory in-service operation of mechanical and electrical equipment and related components for a period of six months following final acceptance of the Project, at no cost to the Department for either parts or labor. This requirement does not apply to mechanical and electrical equipment furnished by the Department.

DB 104-15.4 Subcontractor Warranties

Without in any way derogating the Design-Builder's own representations, Warranties, and other obligations with respect to all of the Work, the Design-Builder shall obtain from all Subcontractors and cause to be extended to the Department appropriate representations, warranties, guarantees, and obligations with respect to design, material, workmanship, equipment, tools, and supplies furnished by such Subcontractors, including all such

representations, warranties, guarantees, and obligations required to be furnished by Subcontractors pursuant to the Contract Documents. All representations, warranties, guarantees, and obligations of Subcontractors shall be written so as to survive all Department and Design-Builder Inspections, tests, and approvals, and shall run directly to and be enforceable by the Design-Builder and/or the Department and their respective successors and assigns. The Design-Builder hereby assigns to the Department all of the Design-Builder's rights and interest in all extended warranties for periods exceeding the applicable Warranty period which are received by the Design-Builder from any of its Subcontractors.

The Design-Builder retains responsibility for all Work performed on the Project, including all Work of Subcontractors and all materials and equipment provided by suppliers, vendors and/or manufacturers. Upon receipt from the Department of notice of a failure of any of the Work to satisfy any Subcontractor warranty, representation, covenant, guarantee, or obligation, the Design-Builder shall be responsible for enforcing or performing any such representation, warranty, guarantee, or obligation, in addition to the Design-Builder's other obligations hereunder. The Department's rights under this DB §104-15.4 shall commence at the time such representation, warranty, guarantee, or obligation is furnished and shall continue until the expiration of the Design-Builder's relevant Warranty (including extensions for redone Work). Until such expiration, the cost of any equipment, material, labor (including re-engineering), and/or shipping shall be for the account of the Design-Builder if such cost is covered by such a Warranty, and the Design-Builder shall be required to replace or repair defective equipment, material, or workmanship furnished by Subcontractor.

DB 104-15.5 Reserved

DB 104-15.6 Non-Exclusive Remedy

Any Warranties shall be in addition to all rights and remedies available under the Contract Documents or applicable law, and shall not limit the Design-Builder's liability or responsibility imposed by the Contract Documents or applicable law with respect to the Work, including liability for design defects, latent construction defects, strict liability, negligence, or fraud provided.

DB 104-15.7 Damages for Breach of Warranty

In addition to all rights and remedies available under the Contract Documents or applicable law, if the Design-Builder fails or refuses to provide the Warranty remedy described in this Section DB §104-15, notwithstanding a valid request by the Department, the Design-Builder shall be liable for the cost of performance of the Warranty work by others. The Department may also call on the Surety and/or Guarantor to perform the warranty obligations.

DB 104-15.8 Exclusions

The Warranties shall not require the Design-Builder to perform repair or replacement Work to the extent necessitated by the following:

- A) Normal wear and tear, provided that damage and/or deterioration outside allowable limits specified in the Contract Documents shall not be considered normal wear and tear;
- B) Failure to perform routine maintenance consistent with policies and/or procedures established by the Department or other maintenance agencies, including Utility Owners, or

in the absence of such policies and/or procedures, in accordance with industry standards of maintenance for similar projects in the United States;

C) Rebellion, war, riot, act of sabotage, civil commotion, acts of vandalism, acts of terrorism, nuclear events or ionizing radiation causing direct physical damage;

D) Wind, flood and/or earthquakes and other acts of God which exceed the severity or intensity specified in the Standards applicable to the design as specified in the Contract Documents;

E) Fire, except when fire results from, or is exacerbated by, failure of a component otherwise covered by the Warranty provisions of this DB §104-15.8; and/or

F) Spill or release of hazardous or contaminated substances, unless caused by the Design-Builder's organization or otherwise considered the Design-Builder's responsibility under DB §104-4.3.

DB 104-15.9 Reserved

DB 104-15.10 Warranty Performance Requirements

In addition to the Warranty provisions of DB §104-15, Project components shall meet the performance requirements specified in the Contract Documents.

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI-NA	Airports Council International—North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation Act (2015)
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TDC	Transit Development Corporation
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S. DOT	United States Department of Transportation

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